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In presenting this special Membership Issue, we are indebted to the support of the following advertisers: Monsanto Chemical Company; Thomaston Cotton Mills; Fulton Bag and Cotton Mills, Southeastern Engineering Company; Rohm and Haas Company; Jarman Printing Company; J. E. Sirrine Company; Scott Testers, Inc.; Steel Heddle Manufacturing Company; Phipps and Bird, Inc.; Lockwood Greene Engineers, Inc.

Subscriptions are available to Non-Members of the Institute at the rate of $25.00 per year. Advertising rates are available upon request.

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CONGRATULATIONS TO THE INSTITUTE OF TEXTILE TECHNOLOGY

IN the deliberations and the findings of your Institute the entire Textile Industry is vitally concerned. None more so than those engaged in the production of Cottons in their many forms — the important branch of the Industry in which Thomaston Mills serves in varied capacities:

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ITT Holds Annua M

Mill Members describe practical benefits obtained from Institute research and service – Uniformity Analyzer sales and service plans ready.

MORE THAN 115 prominent textile mill executives saw the newest developments in textile research at the Institute of Textile Technology, according to an announcement by Mr. Roger Milliken, Chairman of the Board of Trustees, whose address opened the Annual Membership Meeting held January 23rd.

"The Trustees are very enthusiastic about the progress made by the research staff during the past year," Mr. Milliken said. "This membership meeting shows that interest. It is the best that we have ever had. We expected 80 people here, we have more than 115."

The members of the Institute reviewed eleven projects which have been emphasized during the last Quarter. These included the recent findings on a new source of tar-like spots on cotton fabric and methods of eliminating them; a completion of the project on the ITT Uniformity Analyzer to measure the uniformity of sliver, roving, and yarn, and the fulfillment of plans for Brush Development Company to manufacture, sell, and adequately service the machine.

The visiting mill members also heard a panel discussion on "Practical Benefits Obtained by the Mills from Membership in the Institute." The discussion was led by M. Earl Heard, Vice President in charge of Research, West Point Manufacturing Company, West Point, Ga.

Participants in the round table discussion were: A. W. Bell, Vice-President and General Manager, American Yarn and Processing Co., Mt. Holly, N. C.; T. C. Drew, Director of Research, Spartan Mills, Spartanburg, S. C.; Norman E. Elsas; Chairman of Board, Fulton Bag & Cotton Mills, Atlanta, Ga.; Walter Regnery, President, Joanna Cotton Mills Co., Joanna, S. C.; Roger Milliken, President, Deering-Milliken Company; and R. H. Tuttle, Director of Research and Quality Control, Fieldcrest Mills, Spray, N. C.

A digest of their comments follows:

Mr. A. W. Bell: The Institute's experience in the use of the Colorimeter had convinced him of the importance of this photoelectric aid to the grading of cotton by color, and under Institute guidance, his mill was able to work out a system that greatly improved the control of many varied cottons used in American Yarn & Processing Company blends and mixes.

Mr. Bell also stated that considerable dollar savings were effected through the use of the Institute "trouble-shooting" service, particularly the assistance he received in solving a problem of blue specks on knitted fabric. The standardized testing program of the company was also based on techniques from the Institute, and the reduction in non-uniformity of products resulting from this program were: non-uniformity of card sliver reduced from 17 to 11 percent; combed sliver from 36 to 22 percent;

Trustees At Membership Conference

A meeting of the Board of Trustees of the Institute followed the Membership Conference and was attended by the following Trustees: T. M. Bancroft, President, Mt. Vernon-Woodberry Mills, Inc.; J. P. Holt, President, Aberfoyle Mfg. Co.; J. L. Lanier, President, West Point Mfg. Co.; Roger Milliken, President, Deering Milliken Company; Paul A. Redmond, Jr., Vice President, Alabama Mills, Inc.; Walter Regnery, President, Joanna Mills Co.; Alan B. Sibley, Vice President, Judson Mills; Marshall C. Stone, Treasurer, Pacolet Mfg. Co.; Norman E. Elsas, Chairman of Board, Fulton Bag and Cotton Mills; A. B. Borden, First Vice President, Borden Mills, Inc.; Forbes Bradley, Vice President, Columbus Mfg. Co.; Robert W. Philip, Vice President, Callaway Mills Company; Karl Bishopric, President, Spray Cotton Mills; J. T. Hightower, Vice President, Thomaston Mills; and C. H. Merriman, Jr., Vice President, Crompton-Shenandoah Company.

drawing sliver from 26 to 14 percent; roving from 46 to 28 percent; yarn from 109 to 75 percent.

Mr. T. C. Drew: The Institute's service enabled small and medium sized mills to gain the benefits of a fully equipped research laboratory to supplement their own. Mr. Drew stated that research was started at Spartan Mills as a result of the experience gained at the Institute, and he pointed out that twenty five specific service jobs were performed for Spartan Mills during the past year by Dr. Jack Compton and staff, frequently as a result of telephone calls to the Institute for information on technical problems.

Mr. Walter Regnery: Knowledge gained at the Institute through discussions with staff members was credited by Mr. Regnery as the basis for his system of blending cotton by Micronaire readings. Mr. Regnery gave a paper on this system at a recent meeting of the Textile Research Institute. He stated that his system was derived from ITT techniques and that the method had reduced neps and ends down considerably. Mr. Regnery estimated that the research service of the Institute had saved his company three or four times the amount of dues paid, and that he believed, in the light of recent ITT discoveries, that this savings in the future would become greater each year.

Mr. R. H. Tuttle: Use of the new ITT picker lap meter was cited as one instance where Mr. Tuttle believed that Institute service had greatly benefited his mills. This instrument enabled the overseers to spot the pickers which were producing the best laps, as a result enabling them to do a better job, to cut down on maintenance costs, and to get better settings and speeds which gave more uniform laps and resulted in greater efficiency through the whole mill.

Mr. Roger Milliken: The report by Dr. Jack Compton on the research program was reviewed by Mr. Milliken, who pointed out the importance of the uniformity and other measurements which the Institute had developed by means of special attachments to go with the Uniformity Analyzer. Mr. Milliken stated that machinery tolerance studies at the Institute would have far-reaching effects.

Mr. Norman E. Elsas: The long-range effect of the Institute's academic program of training men on the graduate level was beginning to be felt in the textile industry. Mr. Elsas stressed

Other Members Present

Prominent executives of member mills attending the meeting were: Willis E. Johnson, C. H. Coggin, Wilson Patterson and John R. Holley, Mt. Vernon-Woodberry Mills; J. S. Kenrick, Aberfoyle Manufacturing Co.; J. L. Jennings and F. B. Williams, West Point Manufacturing Co.: K. M. Lowry, Hal C. Byrd of Deering, Milliken Service Corp.; W. E. Broadwell, Deering Milliken Company; and R. W. McCullough, Deering, Milliken Research Trust; E. W. Medbery, J. E. Barksdale, J. H. Ripple and D. E. Simons of Fieldcrest Mills; J. J. Norton, Jr. and J. Jackson of Gaffney Manufacturing Co.; Randolph Brandt, Jr., Lockwood-Dutchess, Inc.; I. S. Pitts, Jr. and D. R. Arrowood of Hartsville Cotton Mills: W. M. Ford, W. B. Etters, T. B. Moore, R. C. Allen and M. G. Wallace of Laurens Mills; Paul A. Redmond, Sr. and A. H. Randall of Alabama Mills, Inc.; J. L. Delany, J. K. Waits, J. M. Rowland and C. N. Franks of Joanna Cotton Mills Company; J. M. Oeland, N. Winroth and F. P. Mullendore of Darlington Manufacturing Company; C. T. Holland, J. W. O'Neal, George D. Baker and W. F. Garth of Pacolet Manufacturing Company; Norman Touchette, W. F. Gerrow of Fulton Bag and Cotton Mills; G. G. Simmons, Drayton Mills; C. C. Roberts, P. A. Workman and W. R. McMullen of Borden Mills, Inc.; Henry Robinson, Columbus Mfg. Company; O. D. Boyd, Martel Mills Corp.; B. W. Whorton, Dixie Mills; James Doughtie, Crompton-Highland; Charles Tabor and Duane Snyder, Crompton-Shenandoah: Evan Higgins and Jim Hill, Cherokee Textile Mills; E. J. Neal and H. D. Whitener, Rex Mills, Inc.: Welsford Bishopric, Spray Cotton Mills: C. H. Reynolds, L.. A. White, W. R. Connelly and Bill Barnes of Spindale Mills, Inc.; C. S. Smith, Grantville Mills; Eugene Cross, Jr., Eugene Cross, III, D. F. Barnes and L. D. Marshburn of Cross Cotton Mills; W. A. L. Sibley, Monarch Mills.

that the ITT graduates, through close contact with the textile research program and an excellent graduate curriculum, were fully trained in research techniques and able to apply their knowledge to mill operations.

The visiting mill members also heard descriptions of various phases of the Institute research, academic, and information program by Dr. J. L. Vaughan, President of the Institute, Dr. Jack Compton, Technical Director, T. L. W. Bailey, Jr., Assistant Technical Director, Dr. L. H. Hance, Chairman of the Committee on Academic Studies, C. M. Bowden, Editor of the Institute's TEXTILE TECHNOLOGY DIGEST, and Miss Mary E. Emerson, Librarian.

Arrangements for the Membership Conference were made by members of the Institute Technical Advisory Committee headed by Chairman Walter Regnery, President of Joanna Cotton Mills Company. This committee, unique in the organization of textile research, has actively directed the research program of the Institute into the most profitable channels from the standpoint of practical mill needs. Members present: Norman C. Armitage, President, Deering Milliken Research Trust; Howard Baetjer, II, Mount Vernon-Woodberry Mills, Inc.; A. W. Bell, Vice-president and General Manager, American Yarn and Processing Company; L. W. Deaver, Vice-president, Cherokee Textile Mills; T. C. Drew, Director of Research, Beaumont Division, Spartan Mills; M. Earl Heard, Vice-president and Director of Research, West Point Manufacturing Company; H. A. Pickford, General Manager, Crompton-Highland Mills; William J. Still, Vice-president, Borden Mills, Inc.; J. W. Swiney, Superindent of Bleachery, Fulton Bag and Cotton Mills; R. H. Tuttle, Director of Research and Quality Control, Fieldcrest Mills.

If you have any of the following issues of the Digest would you please donate them to the Institute Master file? We are short of the following:

July 1944	Index 1947
January 1945	December 1948
July 1945	May 1950
August 1945	June 1950

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ITT Approaches Eighth Anniversary

THE INSTITUTE OF TEXTILE TECHNOLOGY is within five weeks of its eighth anniversary. Nearly eight years ago, twenty-three leaders of the textile industry founded the Institute at a meeting in New York City. Without great fanfare or publicity, these and other executives from many varied and widely scattered textile companies have worked together during the past eight years to construct the means and the organization with which the present Institute is achieving its coveted place as a center of technical service to the mills of America.

The Institute was the first experiment of its kind to these leaders and businessmen. Yet, the organization and methods developed during these eight years have been ingenious and enviable. While writers may say — in future histories of this center of research — that the organization crystallized and became operable through the proper bringing together of men, materials, equipment, and money, no written word will adequately describe the process of this successful combination.

For the textile industry set out — eight years ago — to build a plant that would produce ideas, information, and inventions. Those products spring from the brain and experience of man, as well as the hands. There was no known formula or manufacturing process to produce them. The process had to be built. There was no known pattern by which men could be trained to apply research to the textile mills — and the education of men therefore became a second objective.

During these eight years, the Institute has made great progress in devising the process of producing vital information for the textile industry; the mill records of its trained graduates have reflected the efficiency of the educational program; while the quality of its main product — ideas and inventions — has forged to the front of technical progress, as will be noted from the details related elsewhere in this edition.

What concerns us here is the organization and method of Institute operation.

The Institute is managed by its officers, the Board of Trustees, and the Technical Advisory Committee, as identified on the inside cover of this edition.

These groups meet Quarterly to review and ex pedite the business of the Institute. The Technical Advisory Committee — comprising seventeen outstanding technical and production executives — meets two days, Quarterly. The complete details of all Institute research are reviewed at length by this committee, and their findings and recommendations are passed on to the Board of Trustees.

The Board of Trustees includes twenty-three of the nation's leading textile manufacturers. The Board meets one day Quarterly to implement policy and to empower the officers to conduct Institute business.

While the Trustees have diversified business interests and many responsibilities of their own, they never fail to meet four times a year and give unstintingly of their time and counsel in devising the process by which the Institute can best serve the textile mill members.

These, then, are the units of the Institute's management: the Officers, the Board of Trustees and the Technical Advisory Committee.

The combination of these men with the excellent Research and Administrative staff makes up the organization team. The success of this team, as reflected by the pages of this edition, can be attributed directly to the cooperative efforts of the men who have played these positions to the fullest.

Types of research projects conducted at the Institute of Textile Technology are:

(1) Long-term projects are financed by Institute funds, and the results obtained are first made available to the entire membership. Later, these results may be released to the industry at large through technical publications if the work is of sufficient general interest to warrant such release.

(2) Short-term projects for individual member mills are financed from fifteen percent of a member's dues which have been set aside and designated for member service work. These results are reported immediately to the individual member mill sponsoring the work and, if the sponsor permits, may later be released on the same basis as the long-term project results.

(3) Specific projects for a group of member mills, originating with a request by a member for work more fundamental in nature than that of the short-term project and of sufficient general interest to warrant solicitation of the membership with the permission of the requesting member. Such projects are financed by funds supplied by members of the group in excess of their mem-

8th Anniversary *(Cont'd)*

bership dues. The results are reported directly to the participating members of the group and, at their discretion, may be released for publication as in the case of short-term projects.

(4) Special projects for government agencies and other organizations allied with the textile industry. On release of the results by the sponsor, they are made available to the industry as a whole.

Scope of Research

Projects are assigned by the Technical Director to one of three major divisions of the Research Staff: Physics, Chemistry, and Engineering. However, in actual practice the three divisions cooperate in the study of a given problem.

Some of the outstanding contributions and studies made by these divisions are as follows:

1. Precision measurement of uniformity and other factors of textile quality, including electronic instruments to measure uniformity of laps, sliver, roving, and yarn.

2. Accumulation of data from many varied textile mill sources on uniformity and other factors of textile quality.

3. Studies on warmth of clothing; the use of ultrasonic vibration for improved dye or size penetration; the electrostatic charging of cotton during processing; the relation of physical fiber properties to processing performance; the relationship between spinning conditions and yarn quality.

4. Research on the opening and cleaning of raw cotton; the development of a yarn imperfection counter; microscopical studies to determine which cotton fibers are potential "troublemakers" in processing; the effects of excessive heat during ginning on cotton, and of aging on stored cotton.

5. Rapid methods for determining the nep-forming qualities of baled cotton; causes of streaks in dyed fabrics; reasons for unsatisfactory spinning characteristics of some cotton fibers.

6. Sources of tar spots in finished cotton fabrics and methods of removal; chemical aids to cotton processing including the effects of conditioning oils and colloidal silica on processing and properties of fibers, yarn, and fabrics.

7. Twist setting of filling yarn by surfactant solutions and vapors of various materials; chemical modification of cotton fiber to immunize it permanently to mildew attack and to increase its resistance to heat damage without change in color or odor, and with little change in strength, hand, and dyeing properties.

8. Treatments to make cotton fabric resistant to soiling and easier to wash clean after soiling, including methods which can be applied in home or commercial laundries, as well as in textile mills.

9. Development of more satisfactory methods for the dry cleaning of cotton fibers; the mechanism of soiling and soil retention of cotton and other textile fibers.

10. More efficient drying systems for slashing; a cloth inspection machine to provide a stationary image of moving cloth; modification of long-draft spinning to produce more uniform yarns.

11. Development of testing instruments to measure yarn stiffness; single-fiber stiffness, fiber drag, the water absorbency of fabrics, as well as improvements on several of the standard testing machines.

12. Experiments in weaving at controlled humidities; determination of machinery precision tolerances; tests for locating "poor performance" spindles; yarn-strength prediction formulae.

The Educational Program

The objective of Institute training is to supply men who can apply analytical and creative thinking to textile problems. Research fellowships are granted outstanding students who have demonstrated aptitude for textile science, or who have had some practical experiences in textile work.

The Institute is authorized to grant both the Master of Science and Doctor of Philosophy degrees, although at present only the Master of Science degree is offered. (The Institute catalog is available to students interested in further details on the educational program, or to those who would like to apply for one of the fellowships, the annual closing date of which is April 1.)

The Editorial Service

1. The TEXTILE TECHNOLOGY DIGEST is edited and published at the Institute. This monthly magazine condenses vital textile articles for member mill executives, and has a large outside circulation among non-member mills. Current circulation of the DIGEST is 1,500.

2. The Institute publishes confidential reports of research findings to its mill members.

The Library Service

The Institute maintains a technical library and service for its staff and students, as well as for member mills. The service makes immediately available the Institute collection and that of the University of Virginia libraries. The resources of numerous other special libraries are also open for research use.

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We specialize in reducing and controlling waste in the textile industry. Our service is in use in mills running

Cotton, Wool

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All Types of Synthetics

Our guarantee to you is a savings of at least five times the cost of the program during the first year. The average savings is twelve times its cost.

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SOUTHEASTERN ENGINEERING COMPANY

WEST POINT, GEORGIA

ITT Uniformity Analyzer Measures S

THE UNIFORMITY ANALYZER is the outgrowth of an Institute-sponsored project begun early in 1947 to investigate various types of available instruments to measure irregularity in yarn, roving, and sliver. The Analyzer is now being manufactured, sold and serviced by Brush Development Company.

For mill processing test purposes it was felt that a method was required which would measure weight per unit length so that the measurement would be nearly independent of shape of cross section, compactness, twist, fuzz, etc. It was also felt to be very important that yarn, roving, and sliver all be measured with the same instrument and with the same type of measurement applied to each. To meet these requirements the present Uniformity Analyzer was developed.

The Uniformity Analyzer is an electronic instrument, developed for the purpose of measuring irregularities in yarn, roving and sliver. Materials may be run at comparatively high speeds and a permanent record graph of the variations may be drawn automatically. The device measures weight per unit length and is nondestructive, i.e. the material is weighed without being touched, cut, or deformed in any way other than running through guide eyelets. If the moisture content of a given sample is essentially constant throughout the sample, measurement of the variation in weight of the sample can be made which is independent of the overall moisture content. If the same sample is run through the instrument twice, identical record graphs are produced and the agreement with actual cut-weight measurement is good.

Uses of Analyzer

The Uniformity Analyzer has already been used as a measuring instrument for a wide range of different purposes. The primary use has been in the evaluation of yarn uniformity. A standardized calculation method for evaluating the record graphs has been developed at the Institute, and this calculation expresses the uniformity of a material in terms of "Percent Non-Uniformity". The range of percent non-uniformities in yarn for a wide variety of mills has been developed from several years testing at the Institute. This information is available to members for check control purposes.

Another important use of the Uniformity Analyzer is in finding the cause of faults or irregularities in a given sample which occur at regular intervals. These may be called "periodic defects", or "periodicities", and are generally caused by incorrect adjustment or by worn machine parts at some point in the processing. This "detective work" can frequently be done by looking at the record graph without going through the evaluation calculation. Since both the yarn and the recorded tape are moved by synchronous timing motors, the irregularities can be accurately measured in either length of material or time. These measurements can be definitely related to certain points in the processing, and the trouble eliminated. For example, a flat on the final roll of a spinning frame would cause a partially undrafted thick spot to be produced every three inches of yarn, if the roll were about one inch in diameter. Again, if this flat were on the last roll of the roving process, which was followed by a draft ratio of 15, then the same trouble would show up as a thick spot every 45 inches in the final yarn, and so on. Periodicities have also been found due to grooves around the circumference of rolls, with periodicity caused by the traverse motion. In general, each specific process, such as the spinning frame, roving frame, drawing frame, and card, has its own particular periods which it can introduce, and an experienced operator can pick these out by simple observation of the record graph, if the draft ratios are known.

The Uniformity Analyzer has been used to prepare information for charts of over-all mill operation. Several member mills have supplied sufficient samples so that an average percent non-uniformity could be assigned to the output of the cards, breaker drawing, finisher drawing, first and second roving processes, and final spinning. These charts, arranged like a flow diagram, are helpful in establishing a norm for over-all yarn production of a particular mill. A new set of samples can be tested periodically for check purposes, changes at any point in the processing can be evaluated in terms of improvement in the final end product, and difficulties arising from time to time can be more easily localized to a single faulty process.

In addition to being of great value in providing an accurate check on processing a true and rapid measurement of weight per unit length of yarn, roving, and sliver, is of advantage for

Sliver, Roving and Yarn Accurately

textile research purposes. A number of processing tests have already been run at the Institute using the Uniformity Analyzer for accurate evaluation measurement.

The Uniformity Analyzer has been used to evaluate different types of spinning frames, and has been used to good advantage in accurately determining the effect on the final yarn of omitting one drawing or one roving process.

By using two complete Uniformity Analyzers mounted on a spinning frame, one measuring the roving just before it enters the back rolls, and the other measuring the output just above the balloon, the amount and type of non-uniformity put in by the spinning frame alone has been found, since the non-uniformity of the input roving can be subtracted directly.

Yarn, Roving, and Sliver

Since the final quality of a yarn is in part dependent upon the quality of the sliver and roving used to make the yarn, it is extremely important to be able to measure the uniformity of a wide range of roving and sliver as well as of yarn. The Uniformity Analyzer will handle all sizes of sliver, roving and yarn from 0.08 cotton count sliver (104 grains/yard) to 150s yarn.

QUIZ-PICTURE OF UNIFORMITY ANALYZER

What is the Uniformity Analyzer?

The Uniformity Analyzer is an electronic instrument to measure the uniformity of sliver, roving, and yarn.

What does it measure?

Weight per unit length of the strand.

How does it express the measurement?

In percent Non-Uniformity of the strand?

How does it make the measurement?

By means of a pair of measuring plates, the electrical capacity of which is changed by the mass of material measured. This change is converted by an electronic circuit into voltage which varies as the mass of material varies. The varying voltage is amplified to actuate the graph recorder. Result: a graph of the strand measurement.

Where is it made?

Brush Development Company, Cleveland, Ohio, under license by the Institute of Textile Technology.

Is servicing available?

Yes. Servicing is now being set up for the textile mills by the licensee.

Features of ITT-Brush Uniformity Analyzer

1. Faster
2. Cheaper
3 Accurate
4. Flexible

Details of Features

The Uniformity Analyzer measures yarn and makes a graph at the rate of 300 feet per minute.

The Uniformity Analyzer enables the mill to spot uniformity defects as far back as drawing, by analyzing the yarn.

For example, a roving frame has a bad back roll gear. The non-uniformity caused by the gear will show up in roving and yarn. If yarn is tested on the Uniformity Analyzer, the defect will appear at regular intervals, depending upon the draft at roving and spinning processes.

Thus, so-called long-term variations may be "shown up". This variety of analyses makes the Analyzer flexible for mill detective work.

These varied analyses are made possible by an automatic averaging circuit built into the Analyzer.

At the regular or non-averaging setting on the machine, the Analyzer weighs the strand in one-half inch lengths successively as the strand goes through the measuring device.

By turning the averaging control to position 1, the machine weighs each successive six-inch length of the strand. At position 2, one-foot lengths are weighed, and at position 3, one-yard lengths are weighed.

At these longer lengths, the Analyzer "averages out" the short-term variations and shows up the long-term variations more clearly.

Thus, if a mill wants to do detective work on the effect of long-term variations in yarn, it would use the "averaging" positions. For short-term defects, it would use the regular setting.

These settings make the Analyzer versatile, but another factor also increases its potential flexibility. The Analyzer is built so that additional measuring tools developed at the Institute of Textile Technology may simply be plugged into the Analyzer.

ACRYSOL A-3

MAINTAINS CONSTANT VISCOSITY IN SINGLE END SIZING OF NYLON TRICOT YARNS

- ***25% solution of polyacrylic acid***
- ***uniform viscosity and application***
- ***high adhesion—will not rub off or shed***
- ***maximum protection for the yarns***
- ***easily removed in scouring***

The uniform viscosity and high adhesion of ACRYSOL A-3 are *proved* by Norcross automatic recording viscometers—which measure the viscosity of a solution at 3-minute intervals.

Over a period of 24 hours, viscosity remained remarkably uniform, a major advantage in the production of uniformly sized tricot yarns. At intervals, water was added to replace that lost by evaporation. Thus, the viscosity measurement offers a convenient control of the size concentration.

Supplied as an aqueous solution containing 25% polyacrylic acid, ACRYSOL A-3 is easily diluted to the proper size concentration and viscosity. ACRYSOL A-3 does not rub off or flake during the coning, warping, and knitting operations, and therefore provides maximum protection.

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What The Natural Fibers Are Doing

Cotton, wool and silk, the old standbys of the textile industry, are not standing still. While the more spectacular chemical and mechanical achievements of the past generation have been made in the field of production and processing of man-made fibers, the producers and users of the natural fibers have come to realize in recent years that their products are far from perfect, in terms of consumer utility — and they are beginning to perk up and do something about it.

Manufacturers of synthetic fibers will be the first to admit that consumer articles made from their products are far from perfect. But certain of the characteristics of synthetics, which are innate and inherent in their chemical makeup, are so outstanding as to make the natural fibers wish to approach or equal them.

For example: Until relatively recently it was taken for granted that all-wool garments had to be dry-cleaned; that washing of knit woolens was a painful chore; that moths would ruin at least some woolen article each summer; that silk would turn yellow after washing; that cotton couldn't be used in a tailored suit because it wouldn't dry-clean; that little boy's cotton dungarees would go through the knees. Things like this the consuming public accepted. They were bits of information learned automatically in the process of growing up.

Some of the new synthetics overcome these drawbacks (although, as we have said, the man-made fibers may be less than perfect in other respects.) To go through the list in the preceding paragraph: A Dacron suit can be washed; a Nylon sweater washes easily; man-made fibers are moth-proof, inherently; there is no color change of the fiber itself after washing synthetics; all of the new synthetics have been at least tried out in tailored suits, and can be handled in the conventional established manners; the abrasion-resistance of Nylon, for one, is an outstanding feature.

Cotton Washes Well

This does not mean that synthetics are about to move in and completely displace the three major natural fibers. The expression "washes like a handkerchief" explains cotton's great fortress of strength; it is unlikely, and probably undesirable, that Nylon or Dacron will move into the wash-dress field, much less the handkerchief industry.

It would be impossible to list here all the agencies working on research projects for the natural fibers, or to list the specific individual achievements in their fields. Instead, we shall discuss the work in terms of the objectives, from the point of view of efforts to make the products more attractive to the consumer dollar.

Being agriculture fibers, cotton and wool have behind them an important element of Government support. The Research and Marketing Act of 1946 authorizes the expenditure of Federal funds for research projects connected with agricultural products, the purpose being to enlarge their markets.

Without some centralized assistance, research by cotton and wool producers would be impossible — in the modern sense of the term. Whereas there are a handful of producers of man-made fibers, each with highly-organized facilities, the primary producers of the natural fibers are thousands in number (the farmers), small in average size, and scattered geographically — resulting in a disorganized primary area of production.

National Cotton Council

For cotton, scientific research in the modern coordinated manner, is a post-World-War II development. The National Cotton Council, which today is the driving force behind the several research and market expansion projects, was formed only three years before the war, and was just beginning to get into stride when the conflict cut short its plans. All of its major activity has taken place since 1946. (Since the Federal Act mentioned above was passed in that year, we might say that the year 1946 marks the turning point in the history of cotton research.) The Council now has about 20 economic and scientific specialists concerned with production, marketing and research activities.

The Council keeps its eye on research activities going on in State universities, the textile schools, individual firms both here and abroad, and in any other place where ideas are fermenting that may benefit cotton through increasing its usability. Not the least valuable of its functions is that of publicizing new developments, so that an interchange of ideas may benefit all, and so that the consuming markets may be aware of what is available to them, or will be in the future.

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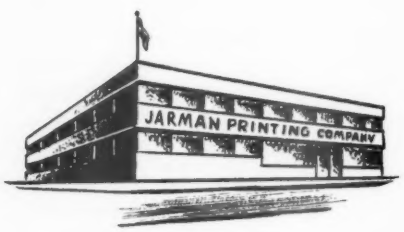

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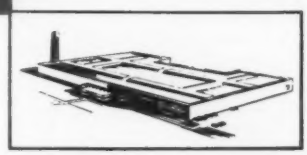
Cotton Research Clinic

The NCC's annual Cotton Research Clinic brings all these elements together for a face-to-face exchange of ideas, and also helps throw the spotlight of publicity on accomplishments. The gamut of subjects covered runs from the field to the fabric. Cotton fiber technology, cotton genetics, production processing. This clinic was first held in 1950. After it was over, the NCC prepared a report, including abstracts of material discussed, plus an appendix which listed active cotton research studies on which information could be obtained by anyone requiring it.

In July 1950, the Department of Agriculture appointed two staff members of the Council as collaborators to its Bureau of Agricultural and Industrial Chemistry. This, the NCC says, amounted to official recognition by the Federal Government of the value of cooperative effort which had previously been on an informal basis. At that time, the Bureau of Agricultural and Industrial Chemistry requested a comprehensive analysis of the whole program on research on cotton at the Southern Regional Research Laboratory. This resulted in a clear-cut program to allocate personnel and funds in proportion to the expected value of their several projects to cotton's long-run markets. At that time, it was decided, for example, to defer or eliminate work on blending of cotton with other fibers. Also, closer liaison was established between the SRRL and mills conducting research projects of their own.

Here is an outline, in summary form, of the channels in which cotton research activity is now progressing — projects which, either directly or indirectly, are aimed at making cotton cheaper, more plentiful, more usable:

Mechanism: The NCC considers mechanization the most significant opportunity in the field of production. Weed and grass control and harvesting are the fields in which the greatest work is yet to be done. Practically every cotton-producing State is carrying on research in this field, as are the manufacturers of farm machinery. Other activities in which mechanization has become an important part of cotton production are: Dusting and spraying insecticides and defoliants. The Beltwide Cotton Mechanization Conference, first held in 1950, in Stoneville, Miss., may turn out to be an annual event. More than 500 interested persons attended, representing every



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segment of the cotton and farm machinery industries.

Insect Control: The economic importance of insect damage to the cotton farmer, and to the price of cotton cannot be overemphasized. The NCC sponsors annual insect control conferences; insecticide manufacturers distribute educational material; and the Federal and State Governments maintain important programs in this direction.

Defoliation: Proper chemical defoliation of the cotton plant is important to improved production of fiber.

Weed Control: Hoeing out the Johnson grass has always been one of the meanest jobs in cotton production — a job for which sometimes there never has seemed enough labor when early rains favor the weed.

Genetics Research and Breeding: Hybridization of cotton is not a new field. Seed distributors have for many years been cross breeding cotton so as to produce a good all-around plant, and to enhance fiber uniformity. Recently, a group of so-called "triple hybrids" have excited the industry, because of their outstanding characteristics of strength.

All cotton breeders and geneticists have access to the facilities of a "tropical cotton station" at Iguala, Mexico, established through cooperation of the national Governments. The work is partially supported by the NCC.

An agronomist of the USDA supervises planting of seed and other functions. In this way, the Winter season is not long, and seed produced at Iguala can be planted in the U. S. belt the following Spring; then the resultant seed replanted in Iguala the following Winter — a two-fold acceleration of development and stabilization of seed strains.

Cotton Diseases: Fungicides and other agents to control diseases of the cotton plant have been developed and are being extended.

Fertilization, Soil Conservation and Culture: Again, education of the cotton farmer is the key to more efficient use of chemical fertilizers, conservation of soil and the basic problems of planting and caring for the cotton plant.

Commercial Testing of New Cottons: The cotton spinning industry cooperates with the NCC and the USDA in spinning new strains of cotton under commercial conditions, so that yarns may

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be tested to indicate the usefulness of the new types of fiber. This program is two-fold: Not only to test the basic manufacturing characteristics of the improved fibers, in comparison with established types; but also to devise means of spinning in order to take full advantage of the improved characteristics.

The cotton spinning industry is gradually becoming aware of the advantages of laboratory measurements in the description of the cotton they buy; and some cotton shippers are using such descriptions. Before 1949, only a few pioneering shippers made use of laboratory instruments to provide precise measurement of cotton qualities, but several fiber laboratories were established during that year for merchants' use; and increased use of these facilities has been recorded subsequently.

"An important step in developing cotton marketing on laboratory-determined qualities," the NCC says, "is to work out means whereby merchants may concentrate shipments based on spinners' laboratory specifications. The Council has proposed that spinners place fiber specifications in the hands of their shippers. Cotton can then be ordered against these specifications . . . Spinners should expect the same confidential service on deliveries against a precise specification as they do against a classing specification."

The classing specification of cotton, its "grade" is determined largely by the cleanness of the sample, absence of trash and leaf, etc. And so, alterations in spinning, harvesting and ginning techniques, as results of the work mentioned previously, may damage the spinning quality of the cotton while improving its apparent "grade" through production of cleaner lint. Wide-spread adoption of lint cleaners a few years ago resulted in complaints from spinners that the cleaner cotton was poorer-spinning. A Cotton Quality Committee has done much to eliminate problems of this sort, so that maximum advantage to the spinning industry can accrue from improvements at prior agricultural and handling stages.

Finishing

We shall discuss now the types of work going on at the fabric production level, aimed at improving cotton's utilization in consumer products.

First of all, we may consider that questions of stronger longer-wearing cottons are primarily a problem of the geneticist, as previously mentioned. While certain types of chemical finishing procedures enhance strength and durability of the cloth, the problems of greater strength

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and wear resistance for all end-uses is one that begins with the fiber on the plant.

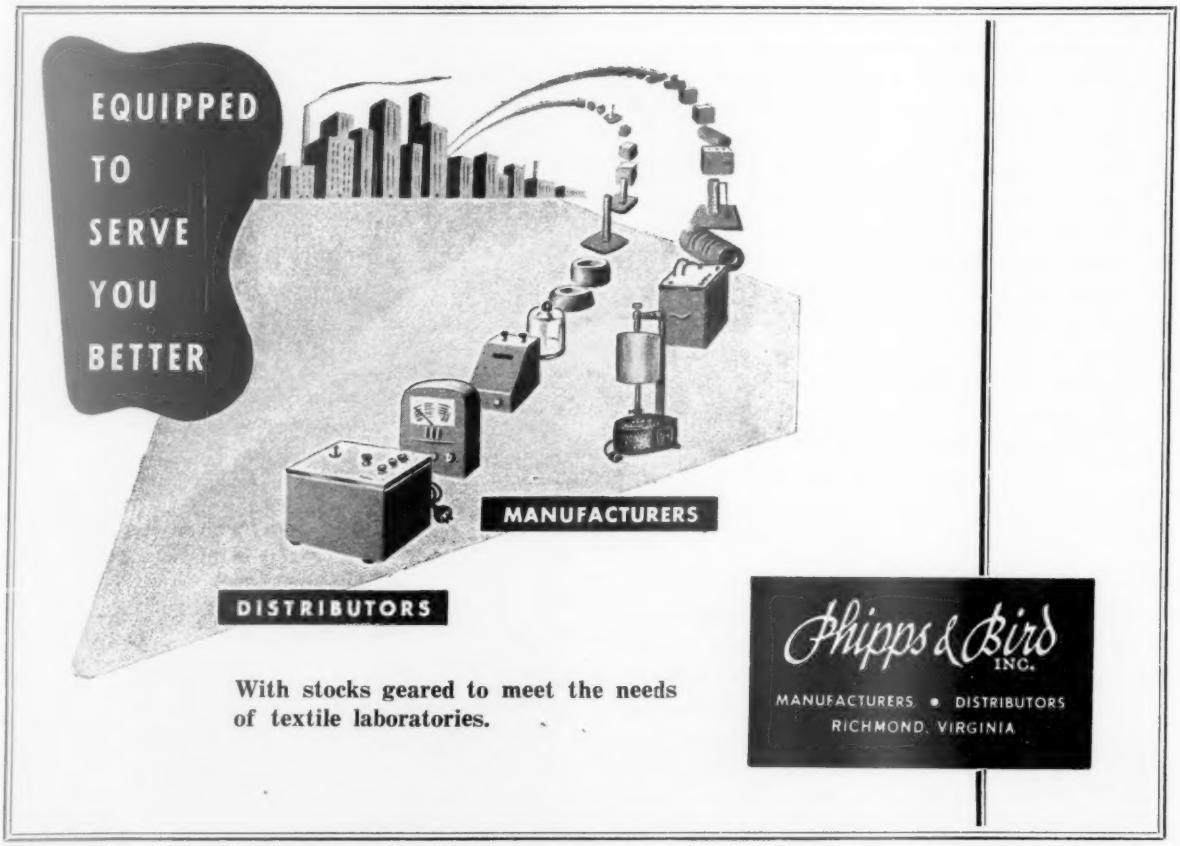
Cotton's present position is perhaps strongest in the matter of dye fastness. The cotton industry maintains that it can deliver fast-dyed products to meet the needs of any end-use, be the product a bathing suit, a dress or a beach umbrella. What is lacking, it is maintained, is an awareness on the part of the manufacturer who buys the cloth and the converter who has it finished. If manufacturers would specify the end-use of the fabric, and order dye jobs which would provide fastness to the conditions expected in that use, the problem would be half-licked.

This whole question of finishing quality becomes more important in the light of the post-war upgrading of cotton's apparel markets — cotton cloths in evening gowns and expensive daytime and afternoon dresses. Actually, the same $1.19-a-yard combed gingham can go into a $12 or a $112 dress, depending on the styling and sewing involved. That's a well-known principle. But since cottons have so long been associated with utility rather than "high-style," added quality points in the finishing help to "sell" cotton for quality garments.

Another problem associated with this use of cotton in more expensive garments is that of dry-cleanability. Cotton does not dry-clean well; and a woman is not going to send her $89 cotton to the commercial laundry or toss it into the "Bendix". The finishing and pressing care that dry-cleaned articles get make dry-cleaning more desirable for expensive garments, and for such items as tailored suits.

Recognizing this, the USDA has given dry-cleaning research an important spot on the agenda. A contract has been let by it to a private research organization, with the objective of developing a means of making either dry-cleaning adaptable to cottons or cottons adaptable to dry-cleaning.*

The textile industry sees in this the means to open broad new markets for cotton goods. One that comes to mind first is tailored suits of summer weight — a market which is being fought out between synthetics and wool, with cotton getting only a small share. The importance of dry-cleaning to cotton suits becomes even more important with the development of wrinkle-resistant finishes, which otherwise



make cotton desirable in the suiting field.

There is a baker's dozen of fields in which the cotton textile industry's research is concentrated.

Crease Resistance: Several promising crease-resistant finishes are now on the market.

Drape: Cotton's drape is superior to other fibers in some end-uses.

Luster: Cotton can be given luster through mercerization and many people prefer the luster of mercerized cotton. On the other hand, the NCC comments "many people desire a much higher luster in the products which they purchase, a luster comparable to the sheen of the synthetics. A relatively inexpensive method for imparting various degrees of luster to cotton fabrics would greatly improve cotton's sales appeal in many uses."

Slipperiness: Although cotton's lack of slipperiness is a definite advantage in some uses, a technique for giving cottons slipperiness would strengthen its position in such uses as coat linings and women's lingerie, where slipperiness is desirable.

Hand: The hand of cotton suggests utility, body and ruggedness to most people, and is an advantage in the end-use items where these characteristics are desired. Research work is being directed toward a process for giving cotton the hand of silk, for fabrics which go into more luxurious end-use products.

Softness: This is closely related to drape and hand, but refers more closely to the feel of the fabric against the skin.

Smoothness: This is closely related to slipperiness and luster, and is highly desirable in many uses. Combed cottons have a relatively smooth surface, but are more expensive. Most carded fabrics lack smoothness. Research work is directed toward development of an inexpensive process for giving carded goods a smoothness comparable to combed fabrics.

Vivid Colors: There is work going on to develop more vivid colors for cotton, and to educate finishers and manufacturers to the availability of those which are now on the market.

Permanence of Finishes: The title is self-explanatory.

Fabric Research: Sources in the textile trade plan more work on the development of cotton crepe yarns — a field which in the past has not proved satisfactory.

Long-Staple Cotton: Increased American production of long-staple cotton is a subject of interest to the textile industries. Adequate quantities of staple cotton at lower prices would mean that many of the finer cloths, which are relatively expensive, could be produced in greater volume and more cheaply.

Immature Fibers: Elimination of immature fibers from the cotton prior to spinning is a matter being given immediate attention. These fibers do not take dyestuffs uniformly and affect the evenness of color in the finished cloth.

Machinery: A discussion of individual advances in processing machinery would have to be encyclopedic. All efforts* in this direction are aimed at lower cost, greater uniformity, greater efficiency. (Staff prepared. **Rayon and Synthetic Textiles,** December 1951, pages 31-2, 53-4, 56, 66, 68, and 70).

*(This work is being done at the Institute of Textile Technology — Editor)

The TEXTILE TECHNOLOGY DIGEST now goes to the principal textile executives of more than 8,000,000 spindles. While 2,500 copies of this special issue are being distributed, 1,500 copies of the regular edition are distributed every month.

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The 18th Century Had A Concept of Research

In 1733, an Englishman named John Kay built a flying shuttle that enabled the Weavers of that day to increase their rate of cloth production. Then, as now, the English weaving trade was generally separated from the spinning industry.

As a consequence, Kay's flying shuttle upset the balance of production between the two trades. And English spinners, still spinning one strand at a time on handwheels, could not produce yarn fast enough for the flying-shuttle looms.

Spinners lagged behind until a weaver interested himself in counter-research to improve the method of spinning. The weaver was James Hargreaves of Blackburn, England.

About 1764, Hargreaves built a machine called the Spinning Jenny which spun several strands of yarn at a time and enabled spinners to close the gap created by increased weaving production.

The significance of Hargreaves' counter-research has perhaps not been repeated in the textile industry.

Yet, the circumstances behind the creation of his machine serve in part to explain the conditions in the textile industry today which brought the present emphasis upon cotton textile research.

During the past twenty years new ideas, techniques, and inventions have piled up in the synthetic-fiber, the paper, and the plastics industries. In just one of these fields, man-made fibers, the potential development seems without limit.

These developments in allied industries started the cotton textile mills toward a research program of their own, but the modern tool of textile research which the cotton mills are creating is much more complicated, to be sure, than Hargreaves' project of counter-research.

Yet, the germ of the idea is the same. Competition enforces the rule that progress be met with progress.

The 20th Century Concept

As a result, cotton fibers are being studied, analyzed, and their properties measured with greater accuracy than before. Cotton fabrics are being treated so that they have properties competitive with some of the newest synthetic fabrics.

Over and above these factors, the cotton mills themselves are important processors of synthetic fibers and must study, evaluate, and develop the newest techniques in the processing thereof.

But even these briefly sketched concepts of cotton textile research may be outweighed by another factor — Production does not wait upon laboratories. It goes on all the time. Equipment wears out or becomes obsolete, and the ever-pressing need for modernization of plant and equipment — and of men — must take advantage of the best possible method at the moment. The textile mills — unlike military aircraft — cannot completely retool for new designs.

New ideas are therefore added to the mills bit by bit so that production can keep going. Modernization proceeds slowly, but it is nearly always in progress in normal good times. It is nearly always incomplete.

One of the characteristics of a good mill man is that he seeks always to improve his job. In this period of increasing costs, the mill man is hard put to satisfy labor, get production within cost, and sell the customer. Herein lies the uniqueness of textile research as practiced at the Institute of Textile Technology.

Here, practical mill men and research men work cooperatively to effect improvements of practical application to the mills. They seek improvements that will help them speed their process of modernization now, as well as specific help of a trouble-shooting nature on everyday production problems. They build better instruments to measure the products, examine the production capacities of machines, and in some cases build machines that produce faster and cheaper.

Neither do they overlook the broad competitive picture. Methods are developed which lead to better blending and cost-saving processing. Fiber studies show them how to make a better product, and chemical modifications of fiber and fabric are examined, with an eye on retaining those existing modifications which prove beneficial and on developing newer ones of greater overall benefit to the industry.

Latest Brush Plans Revealed for Uniformity Analyzer Sales & Service

Brush Development Company sales offices for the Uniformity Analyzer are located at the following addresses:

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915 Ellwood Street
Orlando, Florida

Engineers are available at these offices and in addition, there will be a man who is well acquainted with the textile field to assist on the Uniformity Analyzer. All new purchasers of the equipment will be given at least a day of schooling by one of the field engineers in the use of the instrument and its application.

In the event of instrument failure, Brush has set up two possible procedures for the customers and they are at liberty to decide which is best suited for their particular mill. The first plan would be to make available a guaranteed service policy whereby the technical representative will call on the mill at least four times a year and adjust the instrument and check its calibration. In addition, in the event of a breakdown, Brush would guarantee to send out a field engineer and have him at the plant on an emergency basis. The field engineer would be equipped with tubes and other components which are likely to cause difficulty and which may be readily replaced in the field. If the problem is more serious, Brush will then leave a loaner instrument for the mill to use. Brush will ship the instrument back to the plant and have it repaired and returned to the customer. During the first year of this policy there would be no charge for the cost of defective parts that are replaced in the customer's instrument.

The second plan will be the Brush warranty. This warranty covers the replacement of defective parts by the Customer Service group at the Brush plant in Cleveland. The instrument will have to be shipped by the customer to Cleveland and the customer will bear the shipping charges to and from the plant. A normal service time for this procedure would be approximately three to four weeks

Large Mill Group Joins ITT

The Standard-Coosa-Thatcher Company of Chattanooga, Tennessee, has joined the Institute of Textile Technology, according to an announcement by Mr. R. C. Thatcher, President of the company.

Standard - Coosa - Thatcher manufactures high-quality yarns and sewing threads at mills located in Piedmont, Alabama, Gadsden, Alabama, Rossville, Georgia, and Chattanooga, Tennessee. The mills contain 143,000 spindles.

The first S-C-T mill began operations sixty years ago in Piedmont, Alabama. Two years before that, A. G. Thatcher and Jacob Barlow were operating the Barlow and Thatcher Spinning Company at Henry Clay, Delaware.

While operating the Delaware mill, they formed the Coosa Manufacturing Company in 1891 and interested other men, including W. Lane Verlenden and J. W. Hawke in the Southern mill.

In 1896 the Delaware mill was discontinued, and consolidation with the Coosa Manufacturing Company was made. This consolidation gave the company a total of 15,000 spindles.

From this beginning, Standard - Coosa - Thatcher has grown into a three-state operation which is widely recognized for the quality of its products and the character and skill of the people associated with the mills. Seventy-one percent of the employees have been with S-C-T for more than five years, according to a booklet recently released by the company.

Outstanding Publications Feature ITT

Recently the following prominent publications have featured Institute material or stories: **TEXTILE INDUSTRIES, AMERICA'S TEXTILE REPORTER, VIRGINIA ENGINEER, DAILY NEWS RECORD, INDUSTRIAL & ENGINEERING CHEMISTRY.**

This list does not include news stories. The news of ITT's work on tar spots was carried by the Associated Press all over the country. The United Press carried a re-release on ITT's use of CMC as soiling-resistant agent, and twenty-two individual news items have appeared in individual papers and magazines during the past few months. Two national radio stories, and two local radio stories were released.

The Editorial Department wishes to thank these editors and radio people for their interest, and to state that we appreciate the excellent treatment and handling of the news as released from ITT.

Articles of the Year

FOURTEEN ARTICLES OF UNUSUAL MERIT are condensed in the Article of the Year section which follows. They are selected because we believe they contain information or ideas which readers would like to have at their fingertips.

These articles are not necessarily the best articles of the year, we hasten to add. Neither are they the only good articles to appear last year.

For the privilege of presenting them, we are indebted to the textile press, whose job of reporting and channelizing the flood of technical discoveries today has become enormous.

If the condensations as we present them have merit, the reader's appreciation should go to the original publication, its enterprising editor and author.

Article	*Publication*	*Page No.*
Message from a Mill President to Employees	*The Joanna Way*	25
Spinning Costs are Too High	*Textile World*	26
Nep Count Reduced by Opening and Picking Changes	*Textile Industries*	27
Theory of Carding	*Whitin Review*	28
Why Didn't Someone Think of This Before?	*Textile Industries*	29
Fiber Fineness is Important Factor of Twist Required for Maximum Yarn Strength	*Textile Research Journal*	30
Blending of Cotton by Fineness Determination	Paper carried by many publications	31
Another Source of Tar Spots	*Textile Industries*	32
Position of Textile Industry in Relation to Research and Development	Paper carried by several publications	33
Lille Textile Show Exhibits Many Improvements	*Textile World*	36
Importance of Conservation to Textile Industry	*AATT Magazine*	37
Why Homogenization Helps Slashing and Weaving	*Textile World*	39
Wool Grading in Mill Management	*Textile Mercury & Argus*	40
Tar Spots are With Us	*Textile Industries*	41
Assessment of a Carded Web	*Wool Review*	42

A Message From A Mill President to Employees

EVERY BUSINESS REPORTS to its stockholders at the end of the fiscal year. Joanna Western Mills Company is no exception. We are reporting now, both to those usually called stockholders, those who have invested their money, and to every employee, for you, too, have stock in our business—the security of your job, the rate of your pay, the size of your bonus, even, perhaps, your pride in working for a successful, progressive company. These are your stock.

All who have a stake in Joanna Western's future have a right to know what happens to the return from the sale of our high quality products, the result of your good work. You have a chart which shows what was done with the money we received for the goods sold to our customers during the twelve months ending March 31, 1951. The huge roll of cloth on the chart represents the many millions of yards of cloth turned out at Joanna for use in making the many products marketed by Joanna Western. The unrolled portion is cut into strips representing the amounts devoted to the costs of the various phases of manufacturing, taxes, dividends, etc., thus graphically describing how our sales dollars were spent.

I should like to emphasize that the chart shows the money paid out by entire organization known as Joanna Western Mills Company, which includes: Joanna Cotton Mills Company, the Standard Shade Roller Corporation, Odgensburg, N. Y., and thirteen branch companies which are engaged in warehousing, assembling, and distributing the company's final products.

If you will take your pencil, you will find that out of every $100 that we took in, there was paid out for wages and raw materials $73, which left $27 for all other costs of manufacturing, selling, etc.

If you again take your pencil, you will find that the cost of selling expenses, factory and shipping supplies, taxes, heat, power, light, repairs, and wear and tear, total $19.50, which amount when deducted from the $27.00 mentioned above as remaining after the cost of wages and raw material, left a remainder of $7.50. Higher costs of raw material, work in process, and finished merchandise took $4.60 from this $7.50, leaving $2.90.

The constantly increasing costs and ever mounting taxes compel the company to borrow money from time to time in order to pay for raw materials. (Increased payments for employee social security benefits during 1950 and other Federal increases have added to our company's tax burden.) The cost of such borrowed money last year was $1.10 out of every $100 received.

Deducting $1.10 from the $2.90 we had left gives a remainder of $1.80. From this amount, eighty cents (which is less than one cent on each dollar received) was paid in salaries to the officers and managers of the company's various factories, leaving $1.00 (or just one cent of each dollar received) which was then paid out to the company's stockholders.

It is not an uncommon thing for unthinking or careless people to say that the company is rich or that it has lots of money. Likewise there is a very popular notion that big business makes excessive profits. There are even people who imagine — again without thinking — that whenever we sell $100 worth of goods, about $50 thereof is profit. In this connection, surveys have shown that people who are unfamiliar with business operations think that 10 per cent would be a fair average profit. But the facts are these: In the past twenty years, the average annual profit of all manufacturing corporations has never exceeded 6.2 per cent, according to U. S. Department of Commerce figures. The overall average for the twenty-year period is less than 3.5 per cent.

The large Joanna organization, of which you are an important part, had its beginning in February, 1897. This company was founded by four men who had years of experience in business, and among them, they had saved up the original capital needed to get started. Most business concerns fail and go out of existence long before they are fifty-four years old. Those which do survive for more than half a century do so, not

by accident or lucky chance, but because they have sound business management, loyal and intelligent employees, and men of sufficient faith to invest their money in the business.

If taxes during the first thirty-six years of this company's existence had been as great as they are now, Joanna would not be in a position to provide the job opportunities that are available today. It is these same taxes that take a big bite out of your income each week.

Management is only one of the needed elements for success in business. It takes more than a pitcher to make a baseball team, and what is highly important — all of us must pull together. We have a good organization. By being ever conscious of the importance of maximum quality and production, by eliminating all forms of waste, by properly operating and maintaining the equipment for which we are personally responsible, and by taking care to work safely, we can have a part in keeping our organization good and even making it better. (Walter Regnery, *The Joanna Way*, October 1951, page 9.)

Article of the year

Spinning Costs Are Too High

IF YOU SPIN cotton carded yarn, it's almost certain that you can reduce your costs 30% or more.

On the face of it, this is an astonishing statement; and without the facts and figures to back it up, such a statement would be meaningless. Carded-yarn spinning is one of the branches of the industry where most technological progress has been made in the last two decades. It is surprising, to say the least, that so many good and profitable mills are operating so far short of what they could do. Yet a recent study of fifteen representative mills by well-qualified agencies shows that untold profits are going down the drain.

The study was sponsored and paid for by the U.S. Dept. of Agriculture. It was made by Ralph E. Loper Co., well-known textile engineers, with close cooperation and assistance by the Carded Yarn Assn. The purpose of the study was to show how cotton-yarn manufacturers could increase efficiency and reduce costs. The fifteen mills studied were compared with model mills, laid out on sound engineering principles and equipped with machinery known to be practical.

The most important thing found out was this: Total yarn-manufacturing costs in the mills spinning 10s yarn ranged from 12.88¢ to 17.78¢ per lb. and averaged 15.05¢. For the model mill, the cost was 10.54¢—a saving of 4.51¢ per lb., or better than 29%. Costs in mills spinning 20s and 30 yarn followed much the same pattern.

Labor costs account for most of this 29% loss. In some instances, wage rates ran labor costs up; but by far the greatest money loss in the fifteen mills came from inefficient use of labor. It is significant that for 10s, 20s, and 30s yarn one or another of the mills was more efficient at nearly every process than were the model mills. But no mill was as efficient at every process. Areas where most mills are paying for too much labor for the production they get are fly frames, spinning, winding, and handling and storage.

Several conclusions can be drawn from this study of current mill performances. Among them are:

1. Mills are not making the profits they should make.
2. Efficient operation is spotty. Some departments and some processes in almost every mill are top-notch. Others in the mills are eating up profits by their inefficiency.

What can be done about it?

The first thing is to get a copy of this report and compare your operation with it. (Ask for Technical Bulletin No. 1033, August 1951. Address Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., Price 40¢). You'll probably find that you look good in some areas and not so good in others. To recapture the profits that are now going down the drain, you may need a mill-wide moderniza-

tion program. Most likely, though, you will need only to continue the steady program of improvement progressive mills always have under way.

Specific things the report cites as needed by most mills are:

1. New and modern machinery for opening, picking, roving, and spinning.

2. Arrangement of machinery for better flow of work and more efficient operations, better lighting, evaporative cooling, and better humidification.

3. Full workloads based on the improved machinery and working conditions. (Editorial, *Textile World*, October 1951, page 4.)

Article of the year

Nep Count Reduced by Opening and Picking Changes

IN AN EFFORT to reduce neps, several preliminary tests were run which appeared to indicate that neps were increasing as the stock passed through each process. Therefore, cotton samples which represented an average mix were taken from the bale and run directly on the card, making by hand a sheet about the thickness of a lap. The neps were counted and compared with the neps from the regular stock which had been run through the opening and picking processes.

The stock which had been processed conventionally had 5½ more neps per grain than the stock which had been carded directly from the bale.

Repeated tests showed that neps could be reduced by removing the vertical opener from the cleaning line. The vertical opener had been followed by two No. 12 lattice openers and fed by No. 11 condensers at the rate of 900 pounds per hour.

When the vertical opener was removed, the neps were reduced by 1½ neps per grain. Nep count was then 5½ neps per grain.

Reducing beater speeds at the picker (two blade beaters at the back and a Kirschner beater at the front) had the effect of reducing neps further. Speed of 550 rpm was adopted; the fan speed remained at 11 rpm. This change resulted in a reduction to 3½ neps per grain.

Further tests revealed that we could back off the picker feed roll from the beater and obtain further reduction in neps. The setting of the feed roll was changed from 3/16 to one-half inch, reducing neps to 3 neps per grain.

The nep count from the cotton being processed through opening and picking was then getting closer to the nep count obtained by feeding the cotton from the bale into the card by hand. Slowing the beater speed and backing off the feed roll had given us a reduction of about two neps per grain.

The picker was still not doing the best possible cleaning job because light motes could be seen being pulled back into the beater chamber after they had been thrown out through the grid bars. These motes which were being pulled back into the beater chamber were caught in the air current created by the fans in the machine.

This fault was finally overcome by removing the sheet metal cover on the beater bonnet and installing a perforated metal cover of our own design. The perforations were 3/16 inch diameter; the cover had 51 per cent air space and 49 per cent metal.

The perforated bonnet allowed the air to be pulled through the beater chamber (from the room) and stopped the draft through the grid bars. The clean-out door was blocked up to make it solid and to prevent air passing through it.

At last the motes that were formerly being drawn through the grid bars were not pulled back into the stock.

A further reduction of ¾ neps per grain was realized, and we also got the benefit of additional cleaning.

By these experiments in opening and picking processes, neps were reduced from seven neps per grain to 2.75 neps per grain. (*Textile Industries*, August 1951, pages 99-100.)

The Theory of Carding

THE PRINCIPLES of carding in use today are the same ones that were developed and used in England some 200 years ago. No change of major importance has occurred in the top flat card since the adoption of revolving flats about 1890 after many years of trial. While revolving flats did reduce the labor required to process a given amount of cotton, they did not necessarily improve the quality of carding. Some old experienced carders have claimed that better work was produced in cards with stationary flats.

The early theories of carding must be considered inadequate to explain such questions as:

1. Why does the cylinder of a card load during operation?
2. Why does the doffer load during operation?
3. Why are accurate settings necessary between cylinder lickerin, cylinder and flats, cylinder and percentage plate, cylinder and doffer, and cylinder and under screens?
4. Why does a cylinder speed of 165 rpm necessarily give the best results?
5. Why does the centrifugal force of the cylinder not throw the fibers back on the lickerin or on the flats?
6. Why are the present types of card clothing satisfactory?
7. Why does a card operate when its cylinder is covered with non-flexible clothing which is similar to the covering of a lickerin?
8. Why does a continuous stripper on a cylinder cause a card to operate satisfactorily, in some instances, even though it tends to dull the wire on the cylinder?

While today the lickerin is considered the most effective cleaning unit used in cotton processing, this member was added to the carding engine to speed operation and eliminate the need of feeding the machine by hand. The original purpose of the lickerin was to deliver fibers mechanically to the cylinder at a uniform rate. In the development of the lickerin, it was found that additional cleaning of the stock in process could also be obtained.

It is evident that air currents which originate in the carding engine are known to affect the operation of the machine. It is axiomatic that the air surrounding the carding engines is subject to changes in pressure, temperature, and humidity. Investigation indicates that the surrounding air pressure is not an important factor in the carding operation, since satisfactory work is obtained with the same speeds, settings, and accessories whether the carding is done at sea level, at an elevation of 1,000 feet in Atlanta, Georgia, or at an elevation of over 8,000 feet in LaPaz, Bolivia. On the other hand every practical carder knows that the temperature has a decided effect on the operation of these machines. Several carders have stated that very unsatisfactory work is obtained when the room has a temperature less than 50° F. Humidity is also an important factor in carding and a relative humidity of 50 to 55 percent is generally recommended.

Study of the physical properties of air indicates that viscosity is one of its properties which is independent of pressure but which does change noticeably with temperature. Changes in relative humidity do not affect the vicosity of air materially in the range of temperatures in which carding normally occurs.

Since the cylinder of a carding engine may be considered to rotate in a reservoir of still air, according to the Boundary Layer Theory, a series of concentric layers of air of infinitesimal thickness surround the cylinder. The velocity of the layer on the cylinder will be zero relative to the cylinder but will be the same in relation to the stationary reservoir as the surface velocity of the cylinder. The velocity of each successive layer becomes less as its distance from the cylinder increases, until a layer is reached in which the velocity is zero.

Reasons begin to appear to indicate why accurate settings are necessary on a carding engine, when it is realized that the cover plates, the top flats, and the screens form a perimeter to control the boundry layer of air which surrounds the cylinder as it rotates. At this perimeter, which is at the base of the wire in the

flats, and at the surface of the screens, the velocity of the air will be zero. Because the strata of air which surround the rotating carding cylinder have such different velocities, the fibers which are introduced into this boundry layer are subjected to a terrific force caused by the shearing of the air. (Extract from *Whitin Review*, Mar.-Apr., 1951.)

Article of the year

Why Didn't Someone Think of This Before?

VIBRATION PROBLEMS are not uncommon in mill buildings; in fact, ours had existed for many years. The former owners had provided additional columns under the first floor weave room. Also, they had installed a series of steel beam supports at approximately each fifth beam over the entire five floors of No. 2 Mill. These measures probably were adequate until new high speed looms were installed. Despite the fact that the loom speeds were staggered, we noticed a considerable motion in the floors and walls. We found places where the mortar was loosening, and occasionally a brick would fall out.

In our third floor room we could not set the cards to as close settings as we set the first floor cards in No. 1 Mill. In the spinning, the motion was sufficient to unroll the roving in the creels of frames when they were standing. We found it necessary to turn this roving back to take up the loose part so as to prevent breaking back on the start-up.

Another effect noticed in the spinning was that the frames would not remain lined and levelled for a normal period. In addition to these manufacturing deterrents, we were beginning to have more than the usual amount of sprinkler and steam pipe leaks.

The foregoing conditions were prevalent four years ago when the Liberty Mutual came into the picture. Their regional engineer, recognizing the hazard of falling bricks and the possible effect on safety morale of anything adversely affecting the work-conditions, requested a survey of the vibration condition. F. J. Crandell, assistant vice-president of Liberty Mutual, made a series of vibration tests which are described in his report.

So as not to fly under any false colors, let me explain at this point that we know nothing about the technical side of vibration. These vibration engineers speak a language all their own. Many times in our conferences, we had to stop them and ask them to say it in plain old cotton mill English. We would like to pay a tribute to the patience of Mr. Crandell and D. W. Lenahan while explaining these matters in simple terms. As we understood, the first survey results showed that the buildings would not fall down, at least any time soon. This was comforting, but we learned that the trouble probably would gradually get worse, so we asked for a suggestion to correct the condition.

The first attempt was made in a small area where the beams under the second floor were stiffened by bolting steel channels to them. The test proved that this method would be expensive and that the vibration was not decreased sufficently to correct the trouble. This left us with the only known possible correction—buttresses, which we understood would be expensive and with a possibility that they might not do the job.

It was at this point that Mr. Crandell mentioned his idea of the spring type isolators. He said this method had been successful on bridges and other heavy equipment but had never been tried on a building. To make a long story short (and it was a long story extending over many months while more vibration tests were being made, designs made and remade, etc.), we finally installed a test lot which were so phenomenally successful that we proceeded with the entire installation in both mill buildings.

To sum up our reaction to the results, naturally we were happy about the small cost as compared to any other correction. We are now pointing up our brick work and the mortar is staying. The walls are not vibrating. The floors have some motion but it is a different motion that doesn't produce the troubles we once had. If you looked at the installation you would probably wonder as we have—Why didn't someone think of this before?

(A foreword by A. D. Elliott of the article, "Huntsville's Vibration Problem Solved",) *Textile Industries 115*, 102-106 (March 1951).

Fiber Fineness Is Important Factor of Twist Required For Maximum Yarn Strength

TO OBTAIN maximum yarn strength, mills should analyze the results of a study by the Southern Regional Research Laboratory on the "Effects of Cotton Fiber Fineness on the Physical Properties of Single Yarns." Published in the October 1951 issue of Textile Research Journal, the study gives valuable data on the selection of warp twist multipliers, filling, and knitting-yarn twists with respect to the fineness or coarseness of the cotton used.

Practical mill applications of the study were reported by the authors, Louis A. Fiori and John J. Brown, as follows:

It is common mill practice to select warp twist multipliers on the basis of staple length alone. The twist multipliers selected are usually slightly higher than would be required for maximum yarn strength in order to allow for processing variables. Since fiber fineness, along with length, is an important factor in determining the twist multiplier needed to obtain maximum yarn strength, it follows that mills changing to finer cottons will benefit by using lower warp twist multipliers. A lower twist multiplier would result in higher single-yarn strength, with a corresponding increase in production. Since the present findings show that after maximum single-yarn strength has been reached, the addition of further twist exerts less influence on coarse than on fine cottons, it follows that small changes in twist can be made with coarse cottons without appreciably affecting yarn strength.

The tendency of the finer fibers to break with high turns per inch might explain, in part, the problem of kinky or unruly yarn. This study indicates that when relatively high twist multipliers are used, a fine cotton will tend to become overtwisted and will kink or buckle, whereas a coarse cotton of equal staple length will have less tendency to do so. Possibly the presence in the raw-cotton mixture of immature cotton, which would react essentially like fine fibers, might cause seemingly inexplainable periods of kinky yarns, particularly if high twist multipliers are being used. A reduction in twist might help to solve such a problem. Furthermore, if mills change to cotton which is below average in maturity, they will find it advantageous to use fewer turns per inch in order to obtain maximum yarn strength.

These findings also demonstrate that the flexibility and loftiness required in knitting yarns can be obtained by using fine fibers in combination with low twist without appreciable losses in strength. Filling yarns are usually low-twist yarns and are spun into finer counts than warp yarns, primarily because they do not have to withstand weaving stresses and strains as much as warp yarns do. Filling yarns, therefore, are in that zone of twist range where coarse fibers react very quickly to changes in twist, making them susceptible to sizeable fluctuations in yarn strength. Further, fluctuations in the fineness of the raw-cotton mixture, with respect to fineness, would result in filling yarns of more uniform strength and fabric of better quality.

The study was summarized as follows: The effects of the single fiber property fiber fineness on the physical properties of single yarns, both coarse and fine and of varying twist, were investigated. To permit the study of fiber fineness while maintaining other important properties approximately constant, a special technique was used which controlled the length factor by reducing all the cottons to common quartile and mean lengths. The cottons selected—Seaberry Sea Island, Mesa Acala, Tanguis, and Rowden 41-B—represented extremes in fineness, ranging from 2.9 to 5.6μg. per in., and had other important fiber properties approximately equal. The study showed mainly that a relationship exists between fiber fineness and the turns per inch required in a single yarn to obtain optimum yarn-strength benefits. Low-twist yarns decreased less rapidly in strength from maximum strength when made from fine than when made from coarse fibers. In contrast, high-twist yarns decreased more rapidly in strength when made from fine rather than when made from coarse fibers. Yarns made from coarse fibers required more twist to attain maximum yarn strength than those made from fine fibers. The study also revealed that fiber fineness does not materially affect yarn elongation. In addition, it was found that fiber fineness is a critical factor of roving twist. (*Textile Research Journal*, p. 750-757 Oct. 1951).

Blending of Cotton by Fineness Determination

ONE OF THE MACHINES developed by research scientists to determine accurately and quickly the fineness of the cotton fiber is the instrument known as the Micronaire. From the rate at which air under constant pressure passes through a weighed sample of fiber, the average fineness can be estimated. Once this tool was available, cotton of known fineness could be processed and evaluated in terms of mill operation. It was shown that very fine fibers tended to make a stronger yarn since it had more fibers in a given cross section; however, unless these fibers had unusually high individual strengths, many more neps would develop from the very fine cotton. Very coarse fibers would process with few neps but could not be used to process light yarns, as there are not enough individual fibers per cross section in the yarn to allow proper binding together of these fibers.

Our past procedure was to buy crop lots from chosen localities with some lots containing as many as 1,000 bales. These bales, after purchase, were shipped to the mill and stocked in our warehouses in stacks of about 1,000 bales. When this cotton was consumed, one of these stacks was used up before another was started on. Often one stack would represent one crop lot, and this would be the feed for our mill for two weeks. Our checks on the 1950 crop showed that the fineness of one of these lots of cotton might run as low as 3 μg/in, and when this occurred we would have our mill loaded with very fine fibered cotton which would give us excessive neps, high ends down in spinning, and other difficulties. We therefore decided to assure ourselves that the cotton going into our mill each day would have as far as possible the same average fineness. This was done by grading the baled cotton by fineness as it was received, and blending bales of the finenesses required to achieve the desired average. We have followed this procedure for the entire 1950 Delta crop, and the results have been most gratifying.

After the purchase was made in Memphis, the samples from the bales were expressed to our mill. If the lot represented one crop, the fineness was determined on every fifth bale. If the maximum variation for a given lot were not over 0.5 μg/in, the average of these tests was used to assign a fineness to this lot of cotton. If the variation in reading were more than 0.5 μg/in, all the bales were tested, and the individual bales were assigned their own fineness. Our total purchase of this type of cotton to run into the new crop would be about 35,000 bales. By the time the cotton started arriving at the mill, we had determined the fineness on about half of it. A tabulation of these results showed that if we segregated the cotton into fineness groups, we would be able to blend these groups into the mill daily for the entire crop.

The four fineness groups set up were:

(1) Less than 3.2 μg/in
(2) 3.2 - 3.8 μg/in
(3) 3.8 - 4.2 μg/in
(4) More than 4.2 μg/in

Knowing the fineness of a given lot or bale of cotton by the time it arrived at the mill, we would then store it in a warehouse containing only bales in one of the above fineness groups. Then to feed the mill, a given number of bales could be taken from each warehouse, or fineness group, so that we would have the same blend as to fineness going into the mill every day.

Fineness distribution ranged from 2.6 to 5.4 μg/in for the bales of cotton purchased to run our mill for ten months. This cotton was all very carefully selected, being bought mostly from crop lots in the Memphis area. About 95% of it came from West Memphis, Arkansas, up the river 50 miles, all in Delta Land. The staple of the cotton ran from 1-3/32" to 1-1/8", and the grade was all middling or above. The seed was about 90% D.P.L. 14 with some Stoneville 2B. The most interesting point about the fineness range is that this wide variety of fineness was obtained with such carefully selected cotton. It looks as though it is quite impossible to buy cotton with a narrow range of fineness by selecting either variety or territories. Since this is the case, it seems imperative to blend such cotton by fineness if we expect even running work in our mill.

The operating results from following the procedure already outlined were charted for weekly card nep counts on 100 sq. in. of web for the

1949 crop season, in which we did not blend by fineness, and for the 1950 season. For the time we blended by fineness there was a maximum count of 39 neps and a minimum of 35, whereas the old procedure gave variation from 25 to 54. Further, the general average is lower, even though we had a poorer crop as to nep quality in 1950 than in 1949. It goes without comment that our product was correspondingly more uniform after we blended by fineness than before. We also noticed little variation in ends down throughout the running of the 1950 crop, whereas in 1949 we had the proverbial good and bad days in the running of the work.

We also plotted the average fineness determination made on samples taken daily at the picker. This line varied only between 4.0 and 4.5 μg/in, which clearly demonstrates the effectiveness of our blending system.

The only additional cost to carry out the outlined procedure was for the labor of operating the Micronaire instrument. For the entire crop of 35,000 bales this came to $2,500, or seven cents per bale.

To summarize, I think we can make the following statements:

1. The fineness of cotton strongly influences the quality of yarn produced.
2. Uniform fineness in a supply of cotton cannot be attained by buying cotton of a single variety or from a single region.
3. By measuring the average fineness of each bale and by proper blending on standard mill equipment, one can be sure that the cotton being fed into the mill has the same average fineness from day to day.
4. When the fineness of the cotton entering a mill is controlled in this way, variations in nep count at the card and in the finished product can be reduced. Ups and down in the operation of spinning or card rooms can be eliminated, and spinning production can be held near maximum speed since only a small reserve must be maintained to allow for performance variation.
5. Control of fineness permits a mill to operate its machinery continuously at the optimum settings for fibers of the fineness grade decided upon.

In conclusion, I hope to have shown where we have successfully used a tool and procedure developed in a research laboratory and applied them to our everyday mill operation. Today we produce a better product in fewer man hours because we have utilized this technique. Research in this instance is paying daily dividends. This is only one simple example of where work accomplished can pay off to make our textile industry more competitive. (Paper By Walter Regnery, who credited ITT with originating his method of blending.)

Article of the year

Another Source of "Tar Spots"

CURRENT INTEREST in "tar spots" on bleached cotton fabrics has prompted various organizations to increase their efforts toward finding a solution to the problem. Articles have recently been written discussing the situation but no solution has been offered. This discussion is not a proposed solution but a contribution to the knowledge of the problem.

While searching for tarry matter in trash from various processes of cotton mills currently having trouble with "tar spots" on their finished material, some of the trash was sprinkled onto a white cloth that had been placed on the face of an inverted electric iron (375 F) to melt any asphaltic particles that might be present and thus stain the cloth. It was noted that, in most instances, small black stains appeared on the cloth when no asphaltic material could be found by the solvent transfer technique developed in this laboratory.

Microscopic observation (30X) of the cloth revealed that small egg-shaped particles, about 0.5 mm or 1/50 inch in size, of the same general color as the trash, adhered to the cloth at the stains, and when they were pushed to one side were seen to be only empty shells, their contents having exuded to form the stains. The stains, under microscope, were very dark brown rather than black as they had appeared to the naked eye.

Attempts were made to remove the stains by treatment with 1% sulfuric acid for 5 minutes at 120 F; boiling in 2% caustic for two hours; and bleaching in a solution containing 0.2% available chlorine for 15 minutes at 120F. The stain, in a few instances, was partially removed but usually no effect could be noted by these treatments, which are comparable to those employed in finishing cotton goods.

In the cotton plant, and in many other plants, there are small glands or sacs that appear as black specks. These can be readily seen in various parts of the cotton plant, such as in the stem, leaf, and boll, and when punctured in the green plant, show an oily or resinous looking substance varying in shade from yellow to amber and sometimes red or purple. As the plant dries, the contents of the sacs tend to become more viscous and eventually solidify.

Standford and Viehoever of the U. S. Department of Agriculture, have made a thorough study of the glands in the cotton plant. They include resin as one of the several components found in the sacs of the cotton plant and point out that the largest of these are found in the boll.

This laboratory has found that resin sacs from both field-dried and oven-dried cotton burrs resemble very closely the resin sacs found in mill trash. The likeness is both in appearance and in staining characteristics. In some trash known to be from 1948 cotton, the resin sacs had become quite solid and when cut in half under a microscope, showed centers that looked like clear, dark amber resin.

Hereditary and environmental factors may have a definite influence on the size and nature of the constitutents of the resin sacs. These factors are being further investigated by studying a number of varieties of cotton grown in different locations.

Stoddard solvent and chlorinated hydrocarbons, such as carbon tertrachloride, perchlorethylene, and terachlorethane (acetylene tetrachloride) have been used to test for, or to remove, tar spots. The contents of the small resin sacs, "resin-tar," behave similarly toward chlorinated hydrocarbons but are insoluble in Stoddard solvent. By way of further contrast, the "resin-tar" is readily soluble in the alcohols and in acetone, while asphalt is not.

"Tar spot" trouble is a broad problem and one which has been recurrent. Several sources of contamination have been cited, these including asphaltic coated cotton bale ties, roofing asphalt, road tar thrown up into trucks during transportation, railroad cars, oil and grease from machinery, asphalt laminated paper used in the lining of railway cars and in packaging of starch and other raw materials, and cotton pickers' bags water-proofed with asphalt. Of the various sources of asphalt cited, the latter two are probably the most important.

It is not suggested that the "resin-tar" is a primary or principal source of contamination, but it should not be overlooked as a contributing factor. (*Textile Industries*, December 1951, pp. 123, 203-4).

Article of the year

Position of the Textile Industry in Relation to Research and Development

BY DISCOUNTING as not pertinent to textiles much of what might otherwise be erroneously assumed from general industrial research considerations, I had hoped to focus attention on two positive aspects of research in textiles. These two are to my mind extremely vital, and yet to my knowledge have generally been lost in the guff in discussions of textile research. Both have particular significance to textiles because of their peculiarities. Either would justify a much larger fundamental and applied research program than we yet see in prospect.

The first is the one I have been primarily leading up to — this business of being masters of our own fate. It is going to be a boot-strap proposition, with many temptations to relax and accept the many proffered chairs. That mastery can only come from knowledge, and only

research will give that knowledge. We must be able to evaluate the what, how, and why of all proposed materials, procedures, and products without going off on wild ventures on the one hand, or overlooking good bets on the other. We should be able to make up our minds as to what course we should follow for the public's and our own best interests. We can raise the flag on the day we can lay down detailed specifications before the fiber breeders and raisers and tell them to meet them or go sell it to the Government. We can fire a salute that brave day we can tell not only the producer but the world at large that his new miracle synthetic fiber Klipton is a fair material for shoe laces and nothing else. We can pound the drum on the day we put our own designed equipment blueprints out for bids. We'll blare the trumpets the day we can tell the salesman to go duck his head in his bucket of Textrazenol x 428 Ext., Concentrated, 20% solids. We'll really tie one on the day we can, without a quiver in our voice, tell our immediate trade customers, "This is what we are going to make because it is good value for the consumer," and to quit their yapping and get out there and sell it.

And the encouraging part of it all is, these auxiliary groups are going to take it and like it. They will welcome the stronger reference for their own activities. Their targets will be definite and their rewards much surer if, as, and when they hit the mark. There will be some degree of order and a much sounder basis for mutual progress.

I repeat, this order can come only from the strength of the industry that is in the center trying to put it all together; this strength can come only from knowledge, and that knowledge from research. It would seem, then, that it would be in the best interest of all parties to foster this basic knowledge of the materials, tools, processes and products of our business. The auxiliary groups, so well represented here, should take the long-range view and consider the textile industry as the senior partner in their own businesses and not as a middleman, customer, or dupe to be exploited for the short term. That this senior partner needs some enlightenment we shall freely grant. If there is any keynote to this informal paper, though, it is this. All partners will gain by furthering that purpose: All partners, then, should bear some responsibility for this general enlightenment.

The second vital reason for textile research, according to my view, has to do with the people. Though this is more definitely a matter of internal affairs, it has considerable significance for the auxiliary groups as well, for it is a factor which must be reckoned with in all proposals for application of their ideas to the textile industry.

In a nutshell, though it may look like a bombshell in certain quarters, the matter is this: while the textile industry has a rapidly increasing amount of things to be skillful about, it has a diminishing resource of skill to muster to the task. That statement will be resented, I know, and probably misunderstood. But I will try to explain my meaning and its implications.

As we noted earlier, we had a highly developed craft and technology when the scientific approach to things first became popular. The individual and personal skills were a major factor in our operations. Even as plants were set up in new locations there was a nucleus of experience brought in from the older centers, and local skills were developed around that pattern. Until recent years there was a terrific incentive to develop these skills. A person made good in the mills or became a wanderer or went hungry. We still have a dwindling few of the old boys who were in effect apprenticed in their tender years before there was any choice or judgment allowed. The textile industry then had the pick of the local talent, took them young and kept them busy. The development of these skills had the effect that much which was imperfect could yet be made to run and, in fact, became standard. The old boys and girls took pride in their ability to master these. Very frequently their own immediate bosses never knew that a lug secretly filed off here, a strip of leather stuck in there, a dollop of salt thrown in the bath, was the difference between production success or failure. These were secrets on which their jobs depended. If one knew enough secrets, maybe one could become the boss and thus be the one from whom further secrets were hidden.

But further than that there were the highly developed senses by which the operations were controlled. The sound of the machine, the feel of the air, the heft of the strand, were as meaningful as any gauges and charts. The old boys worked by intuition fully as much as by prescribed procedures.

Now there is increasingly an aspect of textile work being a job rather than a trade. We find a much shorter duration of employment even among those that stick with it, a restless turnover, a temporary attitude, a diversion of interest. Some of that may be healthy from a social standpoint. But we also find low incentive, in

fact a defeatist attitude as to skills particularly in those many situations where seniority alone governs employment. We can damn the trends or we can praise them according to our own philosophical views, but we cannot deny them. If we are smart, we shall compensate for them. This is going to take a tremendous amount of research **and** development. It gets down to standardization of basic stock and/or analysis of stock from which standard adjustments in processing may be predirected. It means some very basic and smart engineering of delicate dynamic forces and balances. It means a major revolution in industrial management and control.

None of these will be satisfactorily accomplished by mere dabblings. Few, if any, will be accomplished by auxiliary interests and turned over to the operating textile industry as complete packages all set with green and red control buttons. There are just too many factors for the specific specialists to account for as they tackle individual segments of the basic problem. Instrument makers can show us how to measure certain properties, but cannot tell us what properties we should be measuring, their relative importance, or what to do once we have recorded the measurement. Chemists can work out beautifully balanced processes assuming uniformity of material, but fail us when confronted with the variables with which we contend. Management specialists can tell us how to organize along the ideal lines, but are baffled as to how to get from our present setup to a better one without erasing present investment and staff and starting all over again. It is a bootstrap proposition for the industry itself. First, the frank appraisal and acknowledgment that craft skills, while perhaps a desirable human aspect to foster, are not to be relied on as the predominating control factor in a surplus industry with less than average wages for a given level of skill. Second, the deliberate, positive and enlightened program must be carried out to reorganize on a predominately automatic basis. Anybody who has yet dared to approach the industry's problems in that manner has been immediately struck by the prevalence of opinion as compared to provable and duplicable fact. There is a tremendous job for research to do, to dig up the principles by which textile processes may be automatically governed. It is strange to think of in that way, but we have got to be smarter than we have been even to hold our own.

Beyond these two special needs of the textile industry for research, we of course have the usual objectives of cost reduction and invention of startling new products. With our operatives beginning to get into a decent income bracket, and fibers of all sorts getting to be luxury items, we are going to have to whittle away some more at manufacturing costs or else face a markedly restricted market volume. We will probably also have to run faster in the general rat race of competition for the consumer's dollar, bringing along innovations (and who knows — possibly even improvements) frequently enough to tease the public into buying the new and consigning the old to the rag bag.

Three of these main objectives, and at least part of the fourth, are industry problems even more than they are individual enterprise problems. Some of it will, of course, be done by the individual concerns, but few, if any, will have the backing, scope, or faith to undertake the more basic assignments. They won't be done by the Government, at least I hope not in my time. Little will be done by the schools, at least till they find that their graduates must have that sort of training to get by in the industry. A good deal of it may be done abroad, though I question if we really want to assume the secondary position.

The great bulk of it will have to be done in cooperative, group-sponsored, association activities. These must have the best brains that can be mustered to the task. They must have the intelligent, long-view, sympathetic, and whole-hearted support of all affected groups. Without those, we can look forward to a dismal future as that big guy with the strong back and the weak mind, the victim in all his dealings, and the despair of friends and relations.

(This excerpt from Richard D. Wells' paper at the twenty-second Annual Meeting of the Textile Research Institute is presented with full knowledge that it does not adequately represent the full paper. Readers would do well to obtain the full paper from Mr. Wells, who is Research Director of Bates Manufacturing Co., Lewiston, Maine.)

Lille Textile Show Exhibits Many Improvements

TEXTILE WORLD featured by photographs and texts equipment shown at the Lille, France Textile Show as follows:

1. More uniform yarn and better yarn ballooning from start to finish of a bobbin are said to be produced on a spinning frame that has both the ring rail and spindle rail traversing. The machine was shown by Marzoli Freres & Co., Brescia, Italy.

2. A pendulum-arm roll-weighting arrangement (known as SKF-Norma) was demonstrated by Vereinigte Kugellagerfabriken, Stuttgart, Germany. It consists of a single unit composed of a roll saddle and top-roll arms. The arms serve as holders and guides for the top rolls, eliminating standard cap bars. One advantage pointed out is that the ends of the top rolls are free, and roving ends may be fed to the rolls from the positions ordinarily occupied by the cap bars. Main advantage, however, is that the assembly permits self-alignment of the top rolls with the bottom rolls.

3. A woolen-spinning frame about two years old, was shown by Spinnbau, Dusseldorf, Germany. Latest features of the frame include: (1) a fixed ring rail with a shaft that extends into the frame head to drive the spindles by gears; (2) knee brakes for stopping spindles; (3) a porcupine roll that controls the feed of the roving from the creel package to the drafting fingers and lower draft rolls; and (4) a system of draft-control fingers to control the feel of the roving from the porcupine roll to the lower set of draft rolls. Drafts of 15 to 100 are possible on this machine.

4. **The Whitin Model-J. Comber,** built by Whitin Machine Works, Whitinville, Mass., shown last year at the Atlantic City show, was said by many to be the "hit of the show" at Lille.

5. Driven twister rings are used on the new twister shown by O.M.C.S.A., Borgomanero, Italy. The ring is mounted in a ball-bearing race and has a tape-drive flange that extends below the under side of the ring rail. Four rings (two on each side of the frame) are driven by one tape. The tape circles an individual driving pulley mounted on a shaft driven from a motor in the head end of the frame. Two motors are used—one to drive the spindle-drive shaft and one to drive the ring-drive shaft. Usually, spindles run at 8,000 rpm. and rings at 6,000 rpm.

6. Grinder for wool-card workers and strippers, equipped with both a cover and dust collector, was shown by Dronsfield Bros., Ltd., Oldham, England. The grinder can sharpen two rolls at a time, runs at either 112 or 450 rpm.

7. A gill that uses one group of needles, instead of two as in its standard gill, was shown by Deutscher Spinnereimaschinenbau Ingolstadt, Ingoldstadt/Oberbayern, Germany. The needle bars are placed in horizontal holders instead of a circular holder.

8. **New large-package** woolen-spinning frame shown by Platt Bros. Sales Ltd., Oldham, England, model MWR 1, comes in ring diameters from 3¾ in. to 5½ in., which allow a wide range of yarn numbers to be run with a maximum of production. Swing-down jack-spool cradles, hinged plastic separators between bobbins, ease of operation and accessibility, and simplicity of maintenance are other features of the machine.

9. Preliminary twist is given woolen roving on Bremer's ring spinning frame by the rotating, revolving rolls enclosed in the 2½ in. heads. A pair of small rolls revolve against each other to feed the end from the upper rolls to the spindle. Twist from the spindle goes as far as the feeding heads. The rolls in the head also revolve end-by-end. Shown by Bremer Spinnereimaschinenbau-Gesellschaft, Bremen-Farge, Germany.

10. An automatic quiller for winding all types of yarn on loom quills was shown by W. Schlafhorst & Co., M. Gladbach, Germany. The quiller operates at spindle speeds up to 12,000 rpm. and yarn speeds up to 800 meters per min.

11. An automatic quill-feeding arrangement for its filling winder (sold in the United States by Whitin Machine Works) was demonstrated by Schweiter Ltd., Horgen-Zurich, Switzerland. A hopper at one end of the winder holds the empty quills. A conveyor picks up the quills and distributes them to the various winding heads.

12. **A beam warper** with a winding speed of 600 meters per min. was exhibited by W. Schlafhorst & Co., M. Gladbach, Germany. Automatic means for doffing full beams is provided. The warper can be supplied in a design specially suited for warping soft beams of dyed yarn. In this

model, beaming pressure is controlled hydraulically.

13. A three- and four-pick terry loom was shown by Adolphe Saurer, Arbon, Switzerland. Improvements to terry looms are said to be: (1) mechanical stop motions for both ground and pile warps, (2) harnesses driven from underneath the loom by a two-cylinder dobby driven by gears, (3) terry motion placed outside the loom for ease in making adjustments, (4) filling stop motion that stops the loom before pile-warp delivery so that no adjustment to the warp need be made before a broken pick can be repaired, and (5) all motions are centralized on one shaft.

14. Reeds are cleaned and polished by a machine shown by C. C. Egelhaaf, Reutlingen, Germany. The 14-in. rotary brush runs through the reed from the lower to the upper binding. When brushing is completed according to the brushing cycle the machine is set for, two pumice stones are lowered onto the reed for the polishing cycle. Direction of brushing and polishing are changed automatically. The cleaned and polished reed is pushed forward automatically so that it can be taken out and another put in cleaning and polishing position.

15. A picker-lap tester that charts variation electrically was shown by Deutscher Spinnereimaschinenbau Ingoldstadt, Ingolstadt/Oberbayern, Germany. A lap is mounted on one side of the machine, threaded between two electrically weighted rolls in the middle of the top of the machine, and wound up on a lap take-in pin on the right side of the machine. The top center roll raises and lowers in response to the lap thickness as the lap runs between the rolls. Raising and lowering of the roll causes changes in the electric current in the control box. These changes are used to drive a recording pen on a chart. The tester can be used at the front of a picker so that continuous testing is done. (*Textile World*, July 1951, pp. 90-9.)

Article of the year

The Importance of Conservation to the Textile Industry

WE SPEAK OF conservation today as applied to measures that may be needed to meet a national emergency, such as might present itself to us in the foreseeable future.

I should like you to consider for a moment how the German masters planned to deal with a shortage of textiles in their planning for the second World War. In the first place they were dependent upon imports of practically all of their textile raw materials, including wood pulp. Also they did not have highly durable textile fibers with which to plan. They accordingly initiated, well before the war broke out, two sets of measures: first, to prevent unnecessary damage to texthe fibers by processing; and second, to learn how to make their textile materials wear longer.

One of the most interesting documents which you in the textile industry are likely to read is the mandatory Order No. 7, issued by the Special Commission for the German textile industry on November 30, 1940. This order established regulations and procedures for the bleaching of all kinds of textiles, military and civilian, produced in Germany. It included specific directions for the bleaching of textile raw materials, yarns and fabric of every fiber and every combination of fibers. It laid down specific procedures to be followed for chlorine bleaching, peroxide bleaching and combined bleaching in kiers or in open boil.

I cite this reference to German planning in World War II simple to illustrate a type of measure which some realistic minded planners took in dealing with a potential shortage of textile materials, mill facilities and manpower. It also illustrates the first type of conservation measures of which I wish to speak; the avoidance of manufacturing and finishing processes which reduce serviceability.

An important contribution towards conservation measures of this type comes from efficient production methods in mills. The avoidance of defects in products, which may lead to machinery stoppages, pays off in conservation of textiles as well as in mill profits. The progress made in the American textile industry during the last decade or two in reducing the occurrence of manufactur-

ing defects in fabric structure, which would lower serviceability of the product, is a truly splendid achievement.

Finishing Study Urged

In textile finishing, however, there appears to be less incentive to concentrate upon serviceability of the finished product. Whether in bleaching a fabric to improve its appearance to the eye, or in processing methods to cut cost of labor and materials, there appears to be little concern given as to how the serviceability of the fabric is affected. This is an area to which considerable study could well be given as a defense preparation measure, to determine what agents or finishes damage textiles the least, and which accordingly might be permitted to be used or applied in a time of emergency, and which should be prohibited.

An illustration of the type of finish which reduces the performance of fabrics in use is shown in a problem we have recently had in respect to sewability of fabrics. In this case study showed that approximately half of the filling yarns were severed by the machine needles in the sewing operation. Every possible attempt was made to sew the fabric as received. No matter what was done, the fabric parted at the seams on very slight strain. Refinishing of the fabric overcame this defect, which indicates quite clearly that it was something applied in the finishing process which led to this serious failure.

That this is not an isolated instance is shown in the accompanying table.

Here is shown the fabric strength on deliveries of herringbone twill from 12 different mills. Below the figures of fabric strength is shown the seam strength, and below that, the seam efficiency, which is computed as the ratio of seam strength to fabric strength. On the bottom line is shown the number of filling yarns actually severed by the needles as determined by count. In several cases, as you will note, the loss of strength at the seam was a third or more of the strength of the fabric. Even if the material used in this finish washed out ultimately, the damage had already been done in the sewing of the fabric.

Here is an area of potential conservation that certainly would require attention in an emergency. Damage of this kind is hard to excuse even in time of peace. To prevent this particular type of damage in improper finishing, our Office recently has instituted in our cotton fabric specifications a seam efficiency requirement, under which fabrics having such poor performance in sewing efficiency will be rejected.

Other Conservation Steps

There is another group of conservation measures which will be familiar to many of you, even though some of them run the danger of resulting ultimately in no real saving, or possibly even a loss of manpower and materials, if they lead to actual reduction in service life.

These types of conservation measures include the adjustment of weaving and spinning machinery to produce more yardage and more poundage per unit of time. The bottleneck in the application of such measures occurs, of course, in the preparatory process as was brought out so forcibly in World War II, particularly in the carding operation. The development of plans for standby carding equipment, while not actually a conservation measure, should certainly be considered in the plans of every mill looking forward to possible mobilization production.

As an alternative, plans might well be made for the utilization of filament yarns which require no spinning and yarn preparation, in place of spun yarns. This would be particularly applicable in mills having extra looms, but which may be short of cards or preparatory equipment.

Seam Efficiency of Cloth, Cotton, Herringbone Twill From 12 Sources of Manufacturers

Source	A	B	C	D	E	F	G	H	I	J	K	L	Avg.	Range
Characteristic														
Fabric Strength, lbs.	92	157	86	119	115	82	112	114	106	101	81	128	108	81-157
Seam Strength, lbs.	83	88	75	80	97	80	99	76	88	56	67	109	83	56-109
Seam Efficiency, %	91	56	87	67	84	97	88	66	83	55	82	85	78	55- 97
Filling Yarn Severance, %	1	19	7	34	14	3	12	30	14	27	5	11	15	1- 34

Thus, spun warp and continuous filament fabrics should be regarded as providing a fundamental conservation measure in time of emergency, which would retain the general characteristics of the original fabric. Currently, our office is working on a series of such fabrics, including cotton duck for tentage and equipage, as a means of meeting the present duck shortage, and for making it easier for converted mills which do not have their own yarn sources to produce duck-type fabrics. The chief technical problems to be worked our are those arising from low wet strength, low melting point and the difficulties of applying fire retardant treatments.

Some of these measures, such as the reduction of number of picks, can lead to a lowering of service life, and should not be adopted carte blanche. Research is needed to determine what measures are desirable and safe.

(Dr. S. J. Kennedy, *AATT Magazine*, pages 65-70, June 1951 issue.)

Article of the year

Why Homogenization Helps Slashing and Weaving

A RECENT STUDY of homogenization indicates, by both visual comparisons and physical tests, that a homogenized warp tends to run better than a warp treated with boiled size for three main reasons:

1. Increased fiber lay
2. More efficient fiber bonding
3. Better physical properties

Three yarn samples—unsized, and sized with boiled and homogenized sizes—were obtained at each of three mills cooperating in the study. Each sample consisted of 30 yd. of yarn taken from the end of a warp beam immediately after slashing (except, of course, for the unsized sample obtained from a section beam). The 30-yd. lengths were wound (beam width) onto paper tubes and taken to the testing laboratory, where they were conditioned according to ASTM specifications.

The three types of yarn used in the test were as follows:

1. Coarse—28s carded
2. Medium—40s carded
3. Fine—60s combed

Differences between boiled and homogenized are not as striking as the comparison with unsized yarn, but the homogenizing treatment shows a definite trend toward greater fiber lay.

In observing fiber lay, the greatest advantage of using homogenized size is shown in medium and coarse yarns. The reason may possibly be that with the coarser, uncombed yarns there is greater opportunity for a better size to do a better job than with fine, combed yarns which already have most fibers under control.

With fewer fibers protruding, there is less chance of a fiber being caught in a drop wire, heddle eye, or reed. Hence, increased fiber lay could easily account for at least part of the increased weaving efficiencies reported with homogenized size.

As the chart, "Increase in Strength Due to Sizing," shows, yarns treated with homogenized size averaged somewhat stronger than the yarns treated with boiled size. Once again the coarse and fine yarns show more advantage for the homogenized size than does the medium yarn. This condition is likewise most probably caused by excessive starch on both the medium yarn samples, along with too high viscosity.

The chart, "Decrease in Elongation Due to Sizing," shows that the coarse yarn treated with homogenized size had only 28% of its elongation taken away by the size. The boiled size, however, removed 41% of the elongation that was in the unsized yarn. This fact means that the homogenized yarn absorbs more shock than a yarn sized with boiled size.

Although strength and elongation tests do not always serve as a perfect prediction of weaving efficiency, these tests serve as another indication of the reasons why mills report increased weaving efficiencies after installation of a homogenizer. (Extract from *Textile World*, May, 1951.)

Wool Grading in Mill Management

DESPITE ALL PROGRESS to date, raw wool, tops, yarn and finished goods are bought, sold and used on the judgment of experts. Business in textiles is done by weight and length; nobody buys or sells by diameters. A manufacturer of cloth requires a certain weight of yarn of a given yarn number to enable him to produce a given weight of cloth for a stated length. It would not be easy for a spinner to make yarn to accurate specified diameters, and naturally the question of counts would become completely chaotic. Yarn counts are sized by weight for a given length; cloth is measured by a similar method. Why not wool qualities which should bring them into line also?

What better method could there be, then, than the naming of wool qualities by the counts of fibers. The method, however, requires on efficient procedure to weigh fibers quickly and accurately. Couple this weighing with some standards of finding percentages of fiber-length regularities, and, apart from handle, the job is done.

We start off the procedure by taking a "draw" from the sample top which we examine in the usual well-known manner. If the average fiber length appears right for processing on our type of machinery, then we check for nep content. This method is the easiest, quickest and, I believe, the most efficient to date. We take a total of 20 draws altogether from the top. Four of them from the outside, four from the center, four from the inside middle and four from any two reversed ends.

The number of neps contained in each draw is counted and the draws weighed together later for total weight. Suppose one finds a total of 30 neps for the 20 draws, we would have 30 for a given weight of top. From this the average number of neps contained in an average yard of top can easily be calculated. Suppose the sliver weighs 1 oz. per yard average and the 20 draws weigh a total of three drams.

$$\frac{30 \times 16}{3} = 160 \text{ neps average per yard of sliver}$$

There should not be any large neps at all. We allow as our standard, three small neps average per two draws when the sliver weighs 3 ozs. for 5 yards. In the case of double-combed tops, no more than half that number average per draw, and usually the same number for recombed tops.

Our procedure then continues by taking a draw from the outside of the top. In the orthodox manner we lay out the fibers on a blackboard, placing each alternate draw to produce an array. Ordinary blackboard analysis is now resorted to. Crimp is noted; kemps if present are counted and all general observations made. Then holding the fibers down with one hand, they may be easily stretched out to their full length with the other free hand; on a good velvet board they will remain in such a position for some time. We now trace, with pipe-clay chalk, the tips of the various fiber lengths. Next the outline of the fiber lengths has to be transfered in exact replica to paper. We recommend using good transparent paper ruled and measured. Using a piece of this transparent paper over our chalked-marked blackboard the outline as seen through the paper may be easily traced with pen or pencil.

Our observations of the fibers may now be written in. These might show for example, crimps per inch, number of kemps present, handle, several brights, draw's sticky, etc. For fiber length regularity we have evolved percentage formulae and find that they work perfectly. One may make master charts of fibers simple or elaborate, according to one's taste. We employ master charts for each quality or blend as used for specific purpose. On these charts you will find full particulars as to end breakages, spindle speeds, loads, waste, etc. These masters are made on good solid paper which is not transparent. By placing a newly made chart **i.e,** a transparent one over a master, any irregularity or diversion from the original is at once apparent.

For our next step we obtain the fineness of fibers, and by this we mean the average counts number of all the fibers in the top. Any system of numbering yarns or fibers may be used. We have tried several methods and they all work. A small metal instrument has been invented by us for stretching out fiber crimps, measuring an exact length, and cutting the fibers perfectly clean. Blades of the instrument are exactly 2½

centimeters apart to give us fibers 2½ centimeters long.

By the aid of a microscope and a pair of tweezers it becomes a simple matter to count 500 fibers from the cut packs. These are weighed against a further 500 fibers, only as a safe check.

An average top will have throughout the entire length an efficient blend of the various fibers; we therefore cut out packs from the center of the sliver. (After having made perhaps millions of tests, we are able to vouch for the efficiency of this method).

From the weight and number of fibers, fineness may be quickly found by using the following formula:

1,000 fibers 2½ cm. long equals 25 meters or 2½ m. for 100 fibers weighs perhaps 2.78 mg.

$$\frac{2.78\text{mg} \times 2}{5} = 1.11 \text{ approx.} \qquad \frac{1000}{1.11} = 1/900 \text{ mm.}$$

$$\frac{900 \times 0.885}{} = 1/796\tfrac{1}{2}\text{s worsted count or 56's quality.}$$

The quality of this stock we may term as 1/796s fineness, or number it to any desired counts numbering system.

Everyone knows that spinning property means that finest count that can be spun from any type of stock economically. Different factories have adopted their own standards, depending upon the type of machinery, spindle speeds, loads, size of packages, etc. It rests with each mill to find by actual study the necessary quality and counts number required to produce an average spin.

Our standards are based on: (1) The number of fibers required in the cross-section of a given count; () The percentage of fiber regularity in the top; (3) The expected percentage regularity of the yarn to do a specific job, or produce a cloth which will give the desired quality, as for example serges, gabardines, etc.

Suppose we must have, of necessity, 24 fibers of given stock in cross-section of a yarn, to produce a given spin and certain yarn regularity, we divide the fineness of the fibers by the number of fibers required, to find the limit of the yarn counts. Thus for 58's quality testing

$$\frac{1/900\text{s} \quad 900}{24} = 38\text{s limit}$$

Should a finer count be required, blending of qualities would have to be resorted to, as either way, the cost would be increased and in the first place the yarn would not give satisfaction anyway.

Conversely, to find the quality of yarns in term of fiber fineness, take a yarn whose counts are known by careful test, with approximate known condition (humidity), say 38's counts as above, cut up 10 to 20 inch pieces from the hank. Separate the fibers contained in each piece and count the number of fibers. Should the average number of fibers total 24 for each piece, multiply this by the counts 38s to get 1/900s which is equal to 58s quality. (*Textile Mercury & Argus*, January 26, 1951.)

Article of the year

"Tar Spots" Are With Us

BLEACHERIES AND MILLS are still having their troubles with tar on cotton goods. Opinions among mill men are that in addition to bale ties coated with tar, the foreign material may be thrown onto the bales during transit along highways by truck. A test for locating tar prior to processing in the grey goods mill is now available. One commercial bleachery man advises that he is now "100% on tar goods," every mill which sends fabric to be bleached or finished has tar in the cloth.

More than a dozen years ago mills were troubled with "black specks" showing up in the cloth, and authoritative sources identified the foreign material as "tarry organic matter." Some mill men were of the opinion that the specks were not in the grey cloth, but entered the fabric after the finishing process between the water mangle and the starch mangle.

Atlhough part of the trouble may have been caused as stated, finishing plants and commercial laboratories were quick to point out that the sub-

stance arrived at their doorsteps in the goods and they were not to blame. Furthermore, it was proved beyond dispute that the black specks were in the stock at the time of drafting on cotton type machinery. In many instances the foreign matter appeared in the warp or filling only—not both places.

How "Tar Spots" May Get on Cotton

Cotton fields bordering on freshly tarred roads (thrown by car or truck wheels).
Dropping from airplane wheels while dusting crop.
From wagon wheels while hauling cotton to gins.
Thrown by tractor wheels at gins.
Loading platforms at gins, warehouses, or mills.
Melted roofs at gins, warehouses, or mills.
Re-used bagging and bale ties.
Thrown up by truck or trailer wheels in hauling.
Insides of railroad cars.
Starter switches in fluorescent lights.
Belt dressings, or hard greases.
It has been reported recently that another source of tar is the tarry substance coating on the outside of the bottom of the pickers' sacks, used especially by hand pickers in the Delta region. Many of the sacks supplied to these pickers are about 20 feet long, and the manufacturer of the sacks puts the coating on the sacks to reduce wear when the cotton picker drags them along the rows. Steps are being taken by a national agency to eliminate this source of the trouble.

Testing for Tar Spots

Mills desiring to conduct tests for presence of tar on cotton may secure necessary testing procedure instructions from the Institute of Textile Technology, Charlottesville, Va.; or from the National Cotton Council of America, Memphis, Tenn.

Steps Which May Be Taken by Mills for Temporary Reduction of "Tar Spots"

Bring to attention of shippers so that bales may be properly covered in transit.
Insist on use of clean railroad cars.
Determine whether tar spots predominate on cotton from different sections; action will then depend on purchase polices of mills.
Check loading platforms and storage facilities at mills for cleanliness.
Check for leaking roofs in mill.
Clean drawing rolls and other places where tar may accumulate.
Determine if "tar spots" are actually tar or some other foreign matter, such as belt dressing, heavy grease, etc.
Brush, rake, or pick outside of every bale before processing; dispose of pickings so that tarred stock is so identified and will not find its way into white stock.
Dispose of or store coated bale ties where flaked-off paint will not find its way into the white stock.
Using test procedure available from NCC or ITT, check cotton received for tar.
(*Textile Industries*, October 1951, 110A-D.)

Article of the year

Assessment of A Carded Web

IN PRACTICE the quality of a carded web, whether it be from a woolen, worsted, or felt card, is assessed by observation rather than by a laboratory test. When an overseer inspects a web he looks mainly for cloudiness, nep content, and the presence of vegetable and thready matter.

Cloudiness denotes entangled clumps of fibers and lack of mixing and since disentanglement is one of the chief functions of a card this defect is an indication that the fibers have not been thoroughly disentangled. The fault usually arises from either insufficient carding power; the machine may be too short or it may not be functioning properly, or from passing too thick a stream of material through the machine. It might also

be caused by irregular feeding when the material is fed to the machine in varying thicknesses, but it will be seen that this is in effect the same as passing too thick a stream through the machine in a periodic manner. Cloudy slivers are more common when dyed wools are carded because these are more entangled than white fibers. If the cloudiness is not excessive and the count is coarse then the yarns might be just as regular as if the web had been perfect, but if fine yarns are being made then this fault cannot be tolerated.

The degree of neppiness in a sliver which can be tolerated again depends on the count of yarn being spun and also on the appearance of the finished fabric. Neps in the first place result from the entangled state of the finer virgin wools, and they are very common in the worsted trade. They are also present in slivers from the woolen and felt cards where the original blend often contains a fair proportion of noil; the latter of course is very neppy and it is often very difficult to open these tight clusters of fibers. The degree of tolerance is also modified by the trade. Worsted combers do not object to slivers containing some neps, providing they are large enough to be obstructed by the comb pins, but they do object to the very fine pin-head variety. And slivers which would be considered intolerable in the cloth making industries are accepted as normal in the felt and hat trades, simply because their presence is unnoticed in the finished product. One of the difficulties in assessing the neppiness of a sliver lies in defining a nep. It is only possible to judge these by their size and since it has been shown that large neps are not really troublesome in some cases while in fine yarn spinning the smallest neps are a nuisance, then it will be seen that it is difficult to arrive at a definition which would satisfy all branches of the industry. Nep counts are actually made in worsted carding but it is necessary to know the standard accepted before one can compare figures obtained from different webs.

The degree of vegetable matter found in a web is determined largely by the amount and type in the original wool. Carbonized wools are mainly used in the hatting and felt trades so this problem does not arise in these instances, but in the woolen industry the wool may or may not be carbonized, depending on the amount, the deburring equipment of the card and the requirements of the cloth. The worsted industry, on the other hand, seldom uses carbonized wools and relies on the card and comb for the effective removal of this defect.

Another problem in the true assessment of a web would be to obtain some measure of the degree of disentanglement brought about in the card. By the very nature of things a web must consist of fibers which hold each other together and so they must be entangled to some degree but when does this entanglement become detrimental to subsequent processing? Is it possible for a web to be so entangled that the fibers are prevented from drafting in spinning or gilling prior to combing? It is easy to see that the one extreme condition of entanglement would be complete disentanglement, that is when the fibers in the web are parallel one with the other, but it is difficult to define the other extreme of maximum entanglement and if one takes a web and tries to assess this property it will be found to be almost indefinable. It is, of course, realized that this statement is no solution to the problem, but it is doubtful whether we shall ever break away from the vague generalities of carding until we can assess more accurately the properties of the web. One method, at any rate, of comparing the products of cards is to preserve samples of webs between adhesive transparent cellophane sheets. This material can be brought in four inch widths and after mounting the web can be filed away for future reference. (*Wool Review* October 1951, p. 37.)

Textile Reader's Digest

Business Views of the Month

MILL DEPRECIATION RATES ARE TOO LOW

"The cost to build a new print cloth mill today is $170 per spindle. Consider then the replacement cost of a 100,000 spindle mill built 25 years ago and now in operation. It would be $17,000,000. A mill of this size would be carried on the books at this time at a cost of approximately $5,000,000. At the present rate of depreciation of four per cent, this mill is allowed $200,000 per year for depreciation. At the replacement cost of $17,000,000, the mill would be allowed $680,000.

"Originally the four per cent depreciation was set up whereby the plant property could be completely depreciated in 25 years. On the basis of the cost of replacement, the depreciation now being allowed would take approximately 85 years to depreciate fully; or, to put it another way, on the basis of replacement costs, a textile mill is now being allowed about one and one-sixth per cent depreciation.

"Add to the one and one-sixth per cent depreciation allowance on a replacement basis, the high mortality rate that prevails in textile machinery and equipment today because of obsolescence as well as functional depreciation, and the danger to an industry as highly competitive as textiles becomes obvious.

"High speed machines, multiple shift operations, continuing technological progress that is bringing forth one revolutionary machinery and processing development after the other — these definite characteristics of the modern textile industry offer irrefutable evidence of the inadequacy of the present depreciation allowance for tax purposes." (John A. McPherson, Sr., *Textile Age 16*, February 1952).

HERTWIG SEES END OF MILL READJUSTMENT

We confidently expect substantial improvement in all phases of cotton textile activity during the first half of 1952. There is reason to believe that the long and arduous period of readjustment which has afflicted the industry for six months, and more, is about over. During the final two months of 1951, retail sales have been very satisfactory and preliminary estimates of the holiday trade indicate a sharp upward trend.

Ever since the summer months, distributors to the consumer trade have kept their buying within close bounds pending an improvement in their inventory situation. It now appears from such data as are available that the inventory situation of wholesalers and retailers, as well as the entire range of secondary processors, has undergone a definite improvement. The process has been aided, not only by larger consumer buying in the United States, but also a healthy increase in our export trade. (By Charles C. Hertwig, President, American Cotton Mfrs. Institute, Inc., *The Cotton Trade Journal*, January 25, 1952, pages 1, 7).

1952 TEXTILE INDUSTRY

The textile industry looks for a return to normalcy in 1952. While 1951 was not a really bad year, it was a confusing one. Cotton, woolen, and worsted mills withheld goods from the market almost as much as they offered goods, largely because of the fluctuations in fiber prices. During the year the price of wool reached the highest point in modern times, if not in history, then fell to nearly half that level. Cotton went through the rigors of price fixing, then dropped in price when a bumper crop was predicted as a result of government encouragement of planting. The latest report predicting a crop of some 15,771,000 bales — down 7% from the previous prediction — has sent prices soaring again and has caused another temporary withdrawal of goods from the market.

The textile industry experienced a slump in 1951 very similar to, but not as severe as, the slump of 1937. The slump — actually more of a dip — also was not as bad as the one that occurred in 1948, except possibly in filament rayons. Cotton, woolens, and worsteds all dipped, and filament rayons slumped rather severely. Woolens, worsteds, and cottons were upheld to some extent by defense orders.

The present situation and the outlook for early 1952 is optimistic — not a boom, perhaps, but a return at more steadier conditions. At least it will be less confusing.

Mill-modernization expenditure did not slow down in 1951, even if production did to some extent. In fact, a new record of some $746,200,000 was spent or committed during the year for modernization. Many mills are expanding under certificate of necessity.

New synthetic fibers continued to appear on

the scene in 1951, and a continuation of this trend is forecast for 1952. DuPont introduced Dacron, a fiber destined to replace a lot of wool, especially in men's suitings. American Cyanamid Co. also started pilot-plant production and shipments to mills of a new acrylic fiber known temporarily as X-51. Several long-standing producers of synthetics and companies not now producing fibers are also known to be experimenting with fibers, some of which will appear in 1952.

Textile-machinery manufacturers, faced with shortages of steel and other raw materials, reduced textile-machine production about 50% and switched to defense work. Deliveries of maintenance and repair parts continued, however, although slowed down in some cases.

The much discussed Warner & Swasey weaving machine, finally developed to the point where commercial production could begin, was also slowed down to a near standstill by the impact of defense demands on W & S machine tools. Installation of the machine, in groups up to 50, were receiving acclaim, however, because of higher work loads possible.

One trend sure to continue is research and development work by mills on the use of synthetic fibers. Worsted mills, in particular, are searching hard for the best and quickest way to handle the fibers, both in 100% form and in blends with wool. And when these ways are found, a good many of them will be carried out in the South. (By Prentice M. Thomas. *Pulsebeat of Industry*, 65-6 January 1951).

LOVE AFFAIR OF WORTH STREET AND TEXTILES

Worth Street dates back to the early Dutch settlers of New York. The area was first known as the Annika Jans Farm. Annika Jans later married Colonel Lispenard, whose estate, Lispenard Meadows, stretched for some distance above Canal Street.

Leonard Lispenard had a son, Anthony, who in turn had three sons — Thomas, Anthony and Leonard. It is from these three names that the streets well known to us today derived their names.

Worth Street was originally laid out as Catharine Street, only to be changed to Anthony Street in 1807. It received its present name as a tribute to General William Jenkins Worth, a hero of the Mexican War.

From 1820 to 1860, the wholesale dry goods houses were centered around Pine and Cedar Streets; the retail division on Canal Street. The northward move of both groups was begun after A. T. Stewart had built his great enterprise on Broadway between Chambers and Reade Streets.

Following the removal of the New York Hospital in 1869, Thomas Street was cut through from Church Street to Broadway, and many of the five- and six-story buildings known to us today were erected on Thomas, Worth and Leonard Streets. These have been consistently occupied by textile firms over the years and formed the nucleus of a business district which has maintained its character in one area as long as any other business district in New York.

Statistically, the following facts are known to the industry, but seem incredible to outsiders:

(1) The cotton goods industry in the United States is not only the leading branch of the textile industry in this country but its output exceeds in volume that of any other country in the world.

(2) The textile industry, including cotton, wool, silk, nylon, rayon and the clothing trades, employs more than twice the number of operatives employed by the steel industry, which is the second largest in the country.

(3) More than 60 per cent of the world's supply of cotton is grown in the United States. In a little over 100 years, the cotton industry has grown from a humble beginning to world leadership.

(4) Since water power was of prime importance to the machinery developed by American ingenuity, it was only natural that the early mills were located in the New England States. New York, midway between the cotton-growing areas in the South and the processing mills in New England, became the major trading city and wholesale center. For the most part, the production of the American cotton industry is distributed through selling organizations located in a concentrated area of some 100 acres between Thomas Street on the south, White Street on the north, West Broadway on the West, and Lafayette Street on the east. (By Durand Taylor. *Daily News Record*, Jan. 24, 1952, Section 2, Page 30 and 89).

WILL POOR MARKET LAST UNTIL '52?

In March, 1951, after riding high on the crest of a boom, the cotton piece goods market in the United States slowly started to crumble. Since

that time, in eight short months, this commodity has taken its most spectacular descent in price since 1937.

The present condition of the industry is not much better. The mills are still filling orders out of the backlog of materials. The price of raw cotton has risen slightly to 37 cents, but this has not been much help. Some prices have risen slightly but others have fallen off. It will be a long time before the price of 80 square print cloths are again selling for 29½ cents.

As for the future of the industry—the long range outlook is hopeful. However, the present situation is expected to last throughout the winter of 1951-52. The reason for this is that the inventories are still piled up in the mills. No production can be maintained until these inventories have been diminished a great deal. On the other hand there are some hopeful signs for an increase in business. (By M. I. Kahn, Jr. *Textile Forum*, December 1951, pages 15-16, 44.)

PLASTIC-COVERED NUTS AND BOLTS USED IN CORROSIVE CHEMICAL BATHS

Vinyl-encased low carbon nuts and bolts are being used in corrosive chemical baths by Industrial Rayon Corp., Cleveland, Ohio, to replace more expensive one made from corrosion resistant metals. Not only does the conversion represent a considerable cost savings—the vinyl-encased nuts and bolts cost approximately 14% as much—it is also said that the plastic covered nuts and bolts resist corrosion much better. (*Textile Industries*, February 1952, page 120.)

THE TAX LAW AND RESEARCH

Beardsley Ruml, the New York business and tax economist, seems to like nothing better than upsetting long-cherished, established ideas. The resulting discomfiture of those who held them apparently affords him a little perverse amusement and, in addition, usually provides the Nation with some substantial benefits.

The pay-as-you-go tax system, which sent the experts into a palsy of apprehension when Ruml proposed it, is a case in point.

Last week, Ruml was at it again. In a proposal reported on too briefly at the time, he challenged the 15-year-old concept that business should exercise its privilege to make tax-empt contributions to educational and charitable organizations as a matter of "social duty". It's not merely that, or even principally that, he said. It's a positive opportunity for business to benefit itself.

He and Theodore Geiger, chief economist for the well-esteemed National Planning Association, have worked out the thesis in a little booklet issued by NPA's business committee. Their idea is a minor revolution in itself and could create a major one. Here's the story:

In 1936 a provision was put into the tax law permitting corporations to make a tax-free contribution, up to 5 percent of their earnings before taxes, for educational, scientific and welfare purposes.

Since then, the pressure has been on the business enterprises from universities, research organizations and, for the most part, local charities, to make donations.

The corporations have responded, in a relatively modest way. On the average, they give from seven to eight-tenths of one percent of their earnings to these purposes. In only one year, 1945, did they give more than one percent of earnings before taxes.

Most of the contributions, it would seem, are made to local welfare projects, the Red Cross, Community Chest, etc. This is all very well, Ruml thinks, as far as it goes, but it doesn't go far enough. And, his NPA report asserts:

"The prevailing attitude of mind . . . regards expenditures for (such) purposes as a social duty . . . One might almost say that it is fear of adverse criticism which might result from a failure to contribute . . . which in most cases motivates such expenditures."

What must be done now, the report argues, is to look at the possibility of making such contributions from the positive side, for the "prospect of favorable consequences" and direct benefits to the corporations.

Basic to the argument is the fact that there has been a "dramatic transformation" of tax rates since the law was put on the books 15 years ago. Then, and up until 1939, if a corporation made a contribution of $100 to an educational, scientific or welfare organization, it was giving $81 of the stockholders' money, which would have otherwise gone to them in dividends, and $19 of the Government's money, which would have gone to it in taxes.

But now, it's almost a 50-50 business, with the Government, if you want to look at it that way, matching the business almost dollar for dollar in any such contribution. For the basic

tax rate on corporations is now 47 percent of earnings.

Moreover, if the company is in the excess profits tax brackets, the ratio is even larger. For a company at the top of the bracket, a contribution of $100 means a gift of $23 by the stockholders and $77 by the Government.

To be sure, a company can consider the extra profits it might spend on research, advertising and public relations as only 53-cent, or 23-cent dollars, and can properly ask Ruml why it does not benefit more in those direct applications of its profits than by giving them to some other organization to spend.

The answer, says Ruml, is that in many cases a corporation would get more for its money by donating up to 5 percent of its earnings before taxes than by using them as additional direct expenses itself.

Some examples, real and potential:

1. The Bulova Watch Co. wants good will for its product and also good repairs for it, in every community where it is sold. It established the non-profit Bulova Foundation, which trains disabled veterans, particularly paraplegics, in watchmaking.

In the first place this is good advertising in general. Secondly, it is good advertising in particular, for the veterans who go back from their training to their homes and gets jobs or, as many have done, set up little watch repair shops of their own, are surely kindly disposed toward Bulova. So are their communities, which have often chipped in to finance the new business of the veteran.

Bulova gives a full 5 percent of its earnings each year to its foundation.

2. Company X may need to conduct a special research program costing more than 5 percent of its earnings in bad years and less in good years. But it can only get a tax exemption on actual expenses disbursed each year.

It can "regularize" its program, however, if it sets up a research foundation, which can spend the money at leisure and at a regular pace each year. Or the company can accomplish the same thing by giving the money to a university which will do the research for it.

An added advantage is that the university, or research foundation, can probably get more talented scientists to work for it than can the company itself.

3. If Company X's research project will take only four or five years, the company will be better advised to let a university do it than to do it in its own plant. For when the project is finally completed, the company will not have to worry about a useless bunch of equipment and some excess staff.

4. Twenty-four of America's largest corporations are regular donors to the University of Chicago's Atomic Research Program. They can expect to get concrete results of enormous value over the years. Yet the expense is such that none of them could have prudently financed such a program by itself.

Of course, other non-contributing companies will share in the benefits of the program. Yet it stands to reason that the contributing companies will have, if nothing else, something of and "in" on the projects, and properly so. They will be in the position to exploit the findings earlier and better. It's their money and they will naturally be watching to see what comes of it.

5. Sears, Roebuck & Co. has a flair for community, civic and educational projects in areas where it does a lot of its business. Its donations to these projects certainly do not make the beneficiaries angry at it.

The NPA report suggests that businesses take a new look at the potentials afforded them by the startling changes in corporate tax rates since 1939. They are urged to apply themselves in making donations to educational, scientific and welfare purposes in the same organized and systematic manner that they employ in handling their advertising and public relations. In that way, they can improve their reputations as "good citizens" and at the same time gain substantial benefits at only 53 to 23 cents on each dollar they spend.

The "major revolution", mentioned above, would come to pass if all companies embraced Ruml's advice and donated up to 5 percent of their earnings. The staggering total would be something like $2,200,000,000 a year.

To see what a fantastic amount this is, look at what just one company could do in one year. Five percent of Dupont earnings in 1950 before taxes would increase the total endowment of the Massachusetts Institute of Technology by 50 percent.

Five percent of General Motors' earnings before taxes would add 50 percent to the total endowment of the Carnegie Institution. Five percent of the earnings before taxes of General Elctric in 1950 would permit the creation of a fund out of which one million dollars of scholarships could be paid each year, in perpetuity.

And if all corporations made such donations to the allowable tax-free limit, what of the reve-

nue that would thereby be lost to the Government?

Well, Ruml argues, not all of it or perhaps even most of it would be lost. If a grant is given to the a university, a professor is hired or given a pay boost, and he at once starts paying income tax. Tax revenues derive, be it remembered, not from a fixed amount of money, but from the velocity at which money is spent and more incomes are earned.

Moreover, some of the Federal grants now being made would no longer have to be appropriated, since private corporations would be contributing to the same ends.

And the corollary to this, Ruml believes, is that it is better to have thousands upon thousands of local, private decisions determine what charities and research and educational operations should survive and grow than to have the decision made singly and centrally in Washington. (By Alfred Friendly. *The Washington Post.*)

Technical Highlights of the Month

BETTER HANDLING OF COTTON MARKS PROGRESS

Progress in the cotton spinning and weaving branches of the textile industry in 1951 has varied greatly.

In general, progress in methods of manufacturing, particularly, internal management in the mill, has been great, with progress in machinery and equipment decidedly less and basically along somewhat restricted lines. There have been great improvements in machinery for certain work and in equipment for the whole mill, mainly humidification.

The purpose of this article, however, is only to review the machinery and equipment progress and to venture a prediction as to the probably needed and possible advance in 1952, based on the present situation in the industry and the trends at the moment.

Better Handling

First probably because of the acreage available for 1951 cotton and second, because of the ever increasing cost of cotton mill labor, undoubtedly the greatest progress has been made in better handling of the cotton as it is put in to work in the mill and in neutralizing advancing labor cost as much as possible; i.e., considerably improved opening, blending and cleaning machinery and next, better operation of improved humidifying systems.

A number of opening, blending and cleaning machines have been made available, which when installed properly in conjunction with the mill's existing opening line, have improved (usually coupled with better picker operation), the quality of lap so greatly that the resulting effect has been definite better running of the stock throughout the mill.

To this has been added improved, sometimes additional, humidification coupled with much better operation of same. The combination of the above has resulted in higher individual machine unit production, less waste, better quality products, sometimes an actual reduction in labor cost or at least maintenance of same in terms of cents per pounds of goods produced.

Next probably in importance is improvement in stock-in-process containers for handling, storing and transportation. Unfortunately very, very few mills have done anything along this line and progress from an industry wide standpoint is practically negligible.

Instruments to control most phases of slashing, improved loom parts, heddles, harnesses, etc. to improve weaving, undoubtedly can be considered next in importance.

There has been overall improvement in winders in general. The automatic feeding of bobbins, or quills, on filling winders has been a decided advance.

Slightly improved top rolls, spindles and roving holders for spinning frames have helped but have not been of any great importance.

Card coilers to hold much larger cans have been developed but installation is very slow due mainly to the space factor in card room alleys.

No outstanding advances have come to the attention of the writer in roving, twisting and warping during the year.

Summing up, there has been no development or marketing noticed of any radically new basic machine, such as a picker, card, spinning frame or loom. With these, the progress has been a process of refinement, better manufacturing and occasional improvement in certain parts of the machine. The only completely new machines noticed were opening, blending and cleaning.

To venture an opinion as to exact types of

machines or equipment that will be available to cotton spinners and weavers in 1952 is to throw caution to the winds and have that opinion in the realm of the wildest guess, so it is not being done.

New Devices

To give an opinion as to what is considered would be of great help to the cotton branch of the industry, i.e., what is considered needed, is quite another matter. The four things which are considered would be of the greatest value, are:

1) A device, or instrument, that will analyze a sample of cotton quickly, cheaply and accurately to determine any, or all, of the following:
   a. Maximum length of staple
   b. Minimum length of staple
   c. Length of staple of the majority of the fibers.
   d. Amount of neps
   e. Amount of extraneous matter
   f. Basic quality of fiber.
2) Any machine or piece of equipment that will improve further the opening, blending and cleaning of the ordinary cotton, which will have to be used by the average mill.
3) A radically improved picker.
4) A completely new slasher, which will eliminate all, or at least more, of the bad features of the present machines.

It is realized full well that there are other improvements needed. It is felt, however, if the above four things could be accomplished, 1952 should be considered a banner year in so far as advances in machinery and equipment are concerned. (By James W. Cox. *Cotton Trade Journal*, January 25, 1952, page 20.)

HOW TO MOVE A LOOM IN 14 MINUTES

When the Trion Division Mill of Riegel Textile Corp. expanded recently, 276 Draper E-model looms had to be moved from a room on the ground floor to a newly completed second-floor room directly overhead. Because of close quarters, a fork truck or other mechanical means of transporting the looms up an outside ramp or through the main mill and up an elevator was considered impractical.

It was decided to leave a 7 x 9 ft. opening in the floor of the new room and lift the looms up through this opening. The only special tools required for the job were a portable carriage made in the mill's machine shop at a cost of less than $30.00, an electric hoist that was borrowed from the slasher department, and two chain hoists borrowed from the machine shop.

The looms were moved in eight working days with an average of 34½ looms moved per day, or one loom every 14 min. There was not a single accident involving either personnel or machinery during this operation; and, being confined to the two rooms, it did not in any way interfere with the normal operation of other rooms or depart- (By W. C. Westbrook. *Textile World*, February 1952, pages 126-127.)

OPERATIONS SPEEDED WHEN INSPECTOR DICTATES TO BURLER

Gray Audographs Sound Recorders have been installed at each inspecting and burling table in a Masland plant. Used in conjunction with yardage counters, these recording instruments are helping set new production records in the mending department. Here is how they are employed.

Carpet fabric is mended in two stages. In the first one, an inspector meticulously examines a cut, locating all defects. The cut is then conveyed to the burling table where defects are repaired. The recording apparatus enters the picture when the inspector, having observed a defect while the piece travels over the table, recites the nature of the defect and the yardage at which it occurs into the microphone of the Audograph.

After the full cut has been examined, the inscribed disc is removed from the recorder and inserted into an envelope stapled to the cut. The disc may be handed directly to the burler if the cut is ready for immediate mending.

This disc is replayed by the burler on her Audograph. Listening for reports on defects, the burler advances the cut at high speed to the yardage noted for each defect and repairs them. Formerly, the burler would slowly examine the entire length of cloth in search of chalk-marks. In case one chalk-mark was accidentally neglected, the operator would have to run the piece through again.

Recording has eliminated the visual search factor. The increased production made possible has permitted release of 25 per cent of the original burling personnel for assignment in labor-short war work departments of the mill. Chalk-marking is eliminated. (*Textile Industries*, February 1952, pages 137-138.)

TESTS SHOW HEAT CUTS QUALITY

Spinning quality of cotton is impaired when an excessive amount of heat is used for drying seed cotton during ginning, according to a report

released today by the Industrywide Committee on Cotton Quality.

"Excessive heat in drying seed caused an increase in the number of ends down," or breakages in spinning process which necessitate temporary stoppages, the report stated.

Continuing, the report stated that "where heat was excessive in drying seed cotton:

"1. Grade index was increased while moisture content of lint was markedly decreased. 2. While there was no increase in nep count in card webs, there was increase in neps in dyed cloth."

The study presented results of tests carried out under commercial production methods in six gins, two each of three makes, and in 17 mills in which a great variety of equipment was used.

Tests were made in the Mississippi Delta and in California from three pickings, one by hand and two with spindle pickers. Enough blended seed cotton was obtained by each gin to produce 25 bales of lint. Five test runs of five bales each were made at each gin, with ginning practices varying at each gin.

In cases of ginning with excessive rate of feeding, the tests showed a slight increase in grade index, general increase in strength of the 30's warp and 40's filling yarn, and a slightly improved appearance of 40's filling yarn. (*The Cotton Trade Journal*, January 25, 1952, pages 1 and 2.)

WARP-SHED TESTER EVALUATES SLASHER SIZE

Southern Research Institute has developed a laboratory and "filling-less" loom motion to measure warp shed during weaving and to evaluate different slasher-size formulas. In 5 years of testing, SRI reports that an average mill warp sheds 0.70 to 0.85 lb. per 100 lb. of yarn.

This tester, developed under Avondale Mills sponsorship, is essentially a miniature loom without the filling motion. The main components include two harnesses containing 11-in. flat steel heddles, a reed, and an impact mechanism. The harness, reed, and impact mechanism are actuated by a chain-and-sprocket system powered by an electric motor. The impact action is designed to simulate the action of the reed as it beats in the filling yarn on a loom.

The sample warp yarn is wound on a metal spool, and the spool is mounted on a shaft at one end of the Shed Tester. Ends from the spool are drawn through heddles and a reed and are attached to a metal take-up roll at the other end of the tester.

A fractional horsepower electric motor turns the take-up spool at the rate of 3.6 in. per minute, and the machine operates at a speed corresponding to a loom speed of 172 ppm.

To maintain a constant tension on the warp, a small steel cable with a weight hanging on one end is fastened to the shaft carrying the let-off spool. The cable is wound on the shaft as the yarn advances through the Shed Tester. With a warp of 168 ends, this arrangement gives a tension of 18 grams per end. Between the take-up roll and the impact bar is a set of drop wires for stop motion.

About 20 yards of sized warp yarn are passed through the Shed Tester in each test during a period of about 4 hours. The fibers and size abraded from the yarn as a result of loom action drop in a pan at the bottom of the tester. This material is known as "shed." During operation, the Shed Tester is completely enclosed with a sheet-metal cover. The shed, carefully collected with a fine brush, is weighed; and the result is expressed as the percent of the weight of the total yarn tested. (Edward Abrams. *Textile World*, February 1952, pages 132-33, 286, 290.)

J. F. BOGDAN SURVEYS EUROPE — Part I. Germany

I was given the opportunity this summer of visiting a number of representative cotton textile mills in Western Germany as a member of a consulting team. The mills chosen for inspection represented a cross-section of the industry; some were spinning mills, others were weaving mills, and still others were integrated.

Raw materials supply is one of the basic problems facing the industry. American cottons are much desired, but the shortage of American dollars with which to purchase these cottons has forced the German manufacturer to use the cotton growths of the world. About 50 percent of the needs of the industry were satisfied by American cottons and the remainder by cottons from 31 different countries. These so-called "exotic" cottons were purchased at prices which were often more than twice that paid for American.

Many more cleaning points are used in the German opening lines than in the American. The reason for this was given as due to the high-density bales, though even then, the opening treatment appeared to be excessive.

The picking operation is generally composed of two processes. Automatic lap doffing devices are in use in many of the mills and appear to work very satisfactorily. Most of the picker rooms are not humidified and the problem of accurate lap weight control is not receiving adequate attention.

Rates of carding production are similar to those found in American mills. The quality of the cotton being processed, the excessive opening treatment to which it has been subjected, and to the condition of the carding machinery. Much of the card clothing is in need of replacement.

Two processes of drawing are the rule, though there are instances where a third process with a bi-coil arrangement is used to reduce the sliver size to one-half of normal values so that finer roving numbers can be made on the first roving operation.

The drafting systems of the spinning frames are of the Leblanc-Roth type. Variable speed drives are provided which vary the spindle speed automatically throughout the spinning cycle. End-breakage is excessive by our standards. There are number of factors which contribute to this, most of which can be controlled by the manufacturer. There is a tendency to operate machines at top production speeds to produce every pound possible, without proper regard for efficient or quality production.

Yarn for sale is spun onto light paper bobbins which are repacked and shipped to the weaving mill which handles the cone-winding and warping functions. Cone winders are old and are in need of replacement. Automatic winders are not used. The majority of hand-knotters in use tie the old "chicken-head" knot which contributes to end breakage in weaving. Warpers are generally high-speed units with portable creels which are prepared and wheeled into position behind the warper. The small size of the warping orders does not permit the use of magazine creels.

About 75 percent of the looms in Germany are nonautomatic. It is felt by many managers that investment in high-priced automatic looms cannot be repaid under the conditions of depreciation allowances and wage scales which exist today. The incongrous condition is therefore found in Germany where mills are purchasing new looms which are exact duplicates of nonautomatic looms sixty years old. These weave rooms look like convention halls in session when compared with efficient rooms equipped with automatic machinery. Many of the German mills were damaged or destroyed during the war, of course. That the industry has been able to reach its present efficiency speaks well for the courage, determination, and will of the German manufacturers and workers. That the recovery has been accelerated by the United States through the Marshall Plan is freely admitted. The results are truly a modern miracle.

(By J. F. Bogdan. *Textile Forum,* December 1951, pages 13-14.)

NEW OPENER LINE IMPROVES YARN QUALITY AND STRENGTH

Better quality, higher strength yarn has been the result of the installation of a modern opening and cleaning line at Alma Mills, Gaffney, S. C. This mill, with 27,732 spindles and about 547 looms, weaves print cloths and sheetings.

The mill was handicapped by an inadequate opening room in which cotton went from bale to bale breaker to verticle opener, and then straight to the pickers. This arrangement permitted very little blending from bale to bale and did not include enough cleaning and opening equipment to deliver the cotton to the picker in the proper condition for production of good laps.

Earlier this year, this condition was considerably improved by the purchase of new opening equipment which not only does a great deal more opening and cleaning but permits a thorough blending of the cotton from twenty-four bales at a time.

The new line is made up of six F-15 feed hoppers and two Blend-Master cleaners, all of this equipment being manufactured by the Gastonia Textile Machinery Co., Inc. of Gastonia, N. C. The six feed hoppers are installed in a line, ten feet apart, each dumping onto a conveyor leading to the Blend-Master cleaners. Four bales of cotton are placed in front of each hopper so that the mixture reaching the cleaners is from twenty-four bales.

The feed hoppers are of the spiked apron type, with a revolving doffer knocking the tufts of cotton from the apron and then over a series of grid bars. A new feature of the design is an automatic feed door which will open to permit the entrance of cotton only when the bottom apron can conveniently handle it. The operator may fill the feed bin as full as possible, and the feed to the apron will remain constant. These feed hoppers are, of course, adjustable as to output, and the six at Alma are fixed to feed a total of 1500 lb. per hour to the cleaners.

The two Blend-Master cleaners, installed in series, are designed to both blend and clean the cotton delivered from the feed hoppers. Each cleaner is built with four revolving spiked drums, the spikes being rectangular bars about six inches long. Instead of being spaced straight across the drum, these spikes are spaced on a spiral running from left to right on one drum and then in the reverse direction on the drum above. This arrangement knocks the cotton from one side of the

cleaner to the other to blend it as it is cleaned over the grid bars. (*Textile Industries*, February 1952, pages 105-6.)

LIFT TRUCK HANDLES SHEETING ROLLS

Pacolet Mills, New Holland, Georgia, load rolls of sheeting 108 inches long and weighing approximately 400 lb. with a Hyster-20 lift truck equipped with a 6-ft. ram which may be quickly attached for the operation. The ram is inserted in the core on which the sheeting is rolled.

Employing the ram, the roll is picked up, transported, and stacked in the trailer by one man. The procedure results in a saving of 9 man-hours on every trailer of sheeting loaded. The attachment was made in Pacolet Mills' maintenance shop. (*Textile Industries*, February 1952, page 122.)

NEW TYPE OF NOIL COLLECTOR IMPROVES WAMSUTTA'S COMBING OPERATION

A new type collector for comber noil, made by Turner and Hawes, has been credited with better running work at Wamsutta Mills, New Bedford, Mass.

The device, presently installed on three Whitin Model J. Combers, takes the place of the aspirators. A large fan sucks the noil directly from the rear of each comber and blows it into large bags, like a vacuum cleaner.

Although Wamsutta has only three combers on this system, with larger fans there is almost no limit to the number of combers that could be serviced by one such unit.

The noil from the bags falls between two compression rolls and then into a large truck to be brought to the wastehouse. The oil that clings to the inside of the vacuum bags is blown down by automatically travelling blowrings, on the outside of the bags, whose cycles can be regulated.

Wasmutta has found this system to be most satisfactory. In this vacuum system, there is no loading-up of noil in the waste chutes. Therefore, the brushes and half-laps stay clean with little chance of the brushes throwing waste back into the work. With the new system, the vacuum is present even when the comber stops.

By having a single fan in the air line exhausted through the vacuum bags, the individual aspirator fans on each comber are eliminated, along with the nuisance of the air exhaust under each machine blowing lint around the room.

By eliminating the aspirators and substituting air ducts, much maintenance expense is also eliminated. Those combers with the aspirators require pipe repairs on an average of twice a year. Also, the elimination of this mechanical part simplifies ordinary cleaning. There is a further saving in labor in that there are no noil plans behind each comber to empty every three hours—the waste merely pushes the full truck from under the vacuum bags of the collector and replaces it with an empty one.

This system has allowed Wamsutta to check noil percentages more frequently and accurately on the combers so equipped. Special screens are merely inserted in the air line from the particular comber being checked and catch the noil combed out during the test interval. There are also screens which can be inserted in the air ducts from each delivery to determine noil variation among the deliveries of a single comber.

Removing of noil by this new system does not roll the fibers, form neps, or change its form, since the air velocity is slow and the distance to the collector is short. The saleable condition of the noils is preserved. (*Textile Industries*, February 1952, pages 130-1.)

3

SPECIAL REPORT

ITT Membership Holds Special Meet

One of the most elaborate inter-industry research tests ever undertaken has just been completed under the sponsorship of the National Cotton Council and the American Cotton Manufacturers Institute. The tests combined the efforts of cotton ginners and yarn and fabric manufacturers to show the relation of ginning conditions to yarn and fabric properties.

Through the cooperation of the sponsoring agencies and the seventeen mills, the Institute has been permitted to examine the data from the seventeen mills in order to show another factor not covered by the original concept of the test.

This factor is the relation of mill processing conditions to yarn and fabric properties.

On April 30th, the membership of ITT will meet to see the results obtained from the Research Staff's analysis of the mill processing data. Guests at this meeting will include the seventeen mills who cooperated with the original test. The data released from the tests will not carry individual mill identification.

Part of the April 30th program is reprinted below.

SEVENTEEN MILL TEST REPORT

WEDNESDAY, APRIL 30TH, 1952

Chairman—J. L. Vaughan, President of Institute

Registration—8:30 A. M. ..... Lobby of the Applications Building

Morning Session—9:30 A. M. ..... Auditorium

Welcome ..... J. L. Vaughan

Announcements ..... L. H. Hance

THE SEVENTEEN MILL TEST—SPONSORED BY N. C. C. and A. C. M. I.

JACK COMPTON, *Technical Director of the Institute, Chairman*

1. **SUMMARY OF THE REPORT** on the 17 Mill Test showing the relation of ginning conditions to yarn and fabric properties.

   EARL HEARD, *Vice President in Charge of Research*, West Point Manufacturing Company.

2. **PANEL DISCUSSION** of the findings on the 17 Mill Test showing the relation of *mill processing conditions* to yarn and fabric properties.

   INSTITUTE STAFF.

Discussion from the Floor.

CLOSING REMARKS—Roger Milliken, Chairman of the Board of Trustees and President of the Deering Milliken Company.

BUFFET LUNCHEON—12:30 P. M. ..... Lawn of the Institute or Applications Building in case of rain

TRUSTEES MEETING—12:30 P. M. ..... Seminar Room

(Luncheon will be served to Trustees in Seminar Room)

In the afternoon, members of the Institute and guests will go on a guided tour of the Institute, continue the morning's discussion, or play golf at Farmington Country Club. L. H. Hance, in charge of arrangements for today's program, will indicate the time and place of all events.

(Courtesy of Textile Industries)

Group at Cotton Research Clinic includes J. L. Vaughan, T. L. W. Bailey, Jr., and J. E. Dougherty of ITT

Lap Meter on Demonstration Trip

John W. Johnson, Jr., has just returned from a 800-mile service trip to several member mills, during which he demonstrated the new electronic lap meter and ran lap tests for the mills. Among the mills visited by electronics engineer Johnson were Cherokee Textile Mills at Knoxville, Tenn., Cross Cotton Mills at Marion, N. C., Borden Mills of Kingsport, Tenn., A. M. Smyre Manufacturing Company of Gastonia, N. C., Spindale Mills of Spindale, N. C., Alice Manufacturing Company of Easley, S. C., and Fieldcrest Mills of Spray, N. C.

1952 Cotton Research Clinic

THE ANNUAL COTTON RESEARCH CLINIC was held recently at Pinehurst, N. C., bringing together for exchange of ideas a number of research men representing fiber producers, ginners, warehousemen, merchants, and textile manufacturers. The Clinic is sponsored by the National Cotton Council of America.

Five general topics were explored by the 1952 Clinic: "Cotton Varietal Effects on Processing and Performance"; "Applications and Limitations of Cotton Fiber Tests"; "Chemical Aids to Spinning"; "Cotton Processing Research"; and "Fiber and Processing Studies".

The following members of the Institute staff attended the Clinic: J. L. Vaughan, Jack Compton, T. L. W. Bailey, Jr., Harry A. Mereness, and J. E. Dougherty.

Jack Compton's paper on "Uniformity Studies" was a feature of the panel discussion of "Cotton Processing Research", and Harry A. Mereness discussed "Applications and Limitations of Cotton Fiber Tests", giving information on the utility of fiber tests in aiding mill processing, in a panel discussion chairmaned by R. H. Tuttle, Director of Research of Fieldcrest Mills, and member of the Technical Advisory Committee of the Institute of Textile Technology.

Aubrey A. Hobbs, manager of Development, Controls, and Standards for the Standard-Coosa-Thatcher Company, which is a member of the Institute, discussed "Mill Applications of Colloidal Silica to Cotton".

Business Views of the Month

FORMER SWEEPER AT 25 CENTS PER DAY HAS $2,500,000 PLANT NAMED FOR HIM

A man who started in the textile industry as a 25-cents-a-day sweeper will soon see a $2,500,000 plant that bears his name.

The new synthetics spinning and weaving plant plant being built at Anderson, S. C., by M. Lowenstein & Sons, Inc., will be named in honor of John A. Lyons, a vice-president of the firm.

Mr. Lyons boasts a record of more than 50 years in the textile industry. Most of it has been at Orr Mills, now a division of Lowenstein. Three generations of the Lyons family are associated with Lowenstein. Mr. Lyons' son, Joseph, is executive vice-president in charge of Southern operations, and his grandson is also connected with Orr.

The elder Lyons was born in New York City, but came South with his parents at three. His father moved to Piedmont, S. C., to be a mechanical engineer for Col. H. P. Hammett, who at the time was putting Piedmont Mills into operation.

Looking back over his long association with the industry, Mr. Lyons sums up his observations for successful operation like this:

"A mill is composed of three things: a building, machinery and people. We are all human irrespective of what position we may occupy, and we all want to be treated as human beings." (*Daily News Record,* February 11, 1952, page 34.)

TEXTILE TRADE HAILS COURT'S PERCALE RULING

A decision by the Special Sessions Court this week, which recognized the validity of a definition of a generally accepted trade term, was hailed yesterday as a significant step toward building trade recognition of definitions and greater compliance of ethical trade practices.

The case in point involved the use of the word "percale," which has been generally accepted as signifying a sheet or pillow case having a 180-thread count or better. It was believed that this was the first time that the strength of a trade definition such as this had been tested in the courts. Though the 180 count for a percale has been recognized since 1939 by trade groups, previous disagreements had generally been settled by extra-legal arbitration machinery.

Complainant was Mrs. Kathryn B. Powers, inspector of markets, weights and measures of the Department of Markets. The defendants, Jack Cohen and Leo David Cohen, trading as Classic Imports, were accused of violating Section 421 of the Penal Law of the State of New York, which makes it a misdemeanor to falsely advertise or label goods. The defendants, it was asserted, were selling pillow cases as 79 Imperial Percale and 59 Imperial Percale which, in actuality, did not have a thread count of 180.

The decision by Judges Emilo Nunez, Joseph V. Lascalzo and Gerald P. Culkin recognized the genuineness of the trade definition that the generic term percale did indeed describe a sheet or pillow case with no less than a 180-thread count. The defendants were ruled guilty and will be sentenced on March 26. (*N. Y. Herald-Tribune,* February 29, 1952.)

SOCIALISM IN BRITAIN

"I pay frequent visits to the U. S., and on my recent trips, along with my admiration for the energy and the buoyancy, I always find an uncomfortable feeling that something is happening in American society which is familiar to me because it happened in Great Britain.

"There seems to be in American colleges these days many teachers who speak of the virtues of a centrally planned economy with the starry-eyed enthusiasm and the almost touching innocence regarding the realities of economic life and organization which were so apparent in British universities between the wars. There are to be found in many American middle-class families talk of the supreme virtue of economic equality and signs of a sense of guilt that they are not as poor as some others—which is reminiscent of the conversations and attitudes of many British middle-class families as they fell under the sway of socialist propaganda in the early part of this century.

"There seems to be a growing contempt for profit making, a growing irritability with the untidiness, the tangled ends, the pains of readjustment which a system of free enterprise makes inevitable as, in the course of progress, it continually bursts out of its skin to take a new form. And I begin to ask myself: is it conceivable that the American people, having provided so strong a proof of the virtues of a free economy, are gradually becoming unaware of, or indifferent to, the secrets of their own greatness?

"Perhaps I am all wrong about this—I profoundly hope so. It would be odd and tragic if

socialist ideas, like the movements of men, were destined to travel westward."

In Britain today there is a general feeling that pioneering does not pay, that everyone is working in a confined space, which it is almost impossible to enlarge, that foresight and forethought are likely to be rendered useless by sudden and unpredictable acts of the state. In short, there are no longer any premiums for the old-fashioned economic virtues of energy, tenacity, courage, and imagination. There seems to be three oustanding reasons for this:

1. Present rates of income tax are naturally having a disastrous effect upon the accumulation of capital and the growth of smaller companies, for not only is it more difficult for the small man to plow back his savings into the business but the tax on profits sweeps up a substantial part of the undistributed dividends. Very few new companies are being established these days in Great Britain; the cost of that will have to be paid in future years. Two cases may be mentioned that reveal the present blindness to the normal motives moving men to action. Under the Town and Country Planning Act of 1947 no person selling land may receive for it more than its agricultural value. The purchaser of the land pays a price in two parts: the first part, the agricultural value of the land, goes to the owner; the second part, the value of the land for development, goes to a state agency—the Land Board. The consequence is, of course, that all incentive to sell land has been swept away.

The second case is more recent. On July 27, 1951, the Chancellor of the Exchequer announced, as part of his policy for dealing with the economic crisis, that he intended to restrict the dividends of all existing companies to the rates earned in the previous two years or to 5 per cent on the paid-up ordinary capital; new companies were to be allowed to pay 7 per cent. Such a scheme removes all incentive for companies to do better than in the past; it discourages firms just emerging from a period of costly development in which profits have been low; it stifles the growth of new enterprises where the risk is exceptional and the rate of profit necessarily high.

2. The second general cause of the spirit of defeatism in British industry is the policy of state control of investment. This is carried out partly by the Capital Issues Committee, which must pass judgment on all new large-scale investment, and partly through a series of regulations that control the location and allocation of materials for new building. An entirely new risk has thereby been thrown upon the industrialist who is interested in new developments.

3. The final major cause of the weakening virility of British industry is the uncertainty arising from the sudden changes in government policy brought about whenever it is found that the central planning has been misconceived and violent brakes must be put on the economic system in the hope of avoiding disaster. Where the state does too much planning, no individual is able to do his own planning. The individual businessman may lay plans to expand his factory and suddenly discover that the government now finds it necessary to reduce investment and his project is brought to a stop. Or he may discover that his compulsory export quota has been changed. Or the purchase tax on his commodity has been increased. Or a limit has been put on the dividends he can pay, thus endangering his chance of obtaining risk capital. The British businessman is a little like a surgeon trying to perform a delicate operation while someone is switching the electric light off and on. (By John Jewkes. *Fortune 44*, December 1951, pages 79-81, 176, 178, 180, 183-4, 186, 188, 190, 193-4.)

CURRENT MILL DEVELOPMENTS

Although the textile industry has found the going rough in recent months, new construction and additional installations continue to be reported. James Lee & Sons Co. has announced a new building program that will entail capital outlays of $1,050,000 at its Glasgow, Va., carpet plant. Part of the new facilities will be devoted to defense work, with additional space provided for manufacturing operations, office quarters, and the company's retail carpet clinic. Since the end of World War II the company has invested $13 million in expanding and modernizing its plant and equipment.

Reports from North Carolina disclose that Associated Spinners, Inc., has a $100,000 addition to its Gastonia plant under construction. The new facilities will expand present storage space by about 20,000 sq. ft. and permit an increase of nearly 30% in the plant's synthetic yarn production. Dobson is the site of construction of a new plant by Washington Mills Co. for the manufacture of men's and boys' lightweight underwear. Several hundred people will be employed in the new mill, cost figures for which have not yet been released. Operations will soon begin in the New Creedmoor Co. rayon and finishing plant at Camp Butner near Durham. Most of the machinery, some 600 tons of which had been installed by year's end, came from the for-

mer Mount Hope Finishing Co. of North Dighton, Mass.

Ground has been broken by M. Lowenstein & Sons, Inc., at Anderson, S. C., for a synthetic fabric mill. The new plant, which will cost around $2.5 million, is scheduled to go into operation sometime this summer. The Oneita Knitting Mills with headquarters in Utica, N. Y., has leased 21,000 sq. ft. of warehouse and manufacturing space in Andrews, S. C., for the operation of a pilot plant to make shirts and shorts. United Piece Dye Works reports that it will begin test runs about February 15 in its new million-dollar plant at Charleston, S. C. Although printing may be added later, the modern one-story plant will confine initial operations to dyeing and finishing. About 200 persons will be employed when capacity operations are achieved.

There has just been completed in the "up-and-going" area near Clemson, S. C., a multi-million dollar cotton mill by the Utica & Mohawk Cotton Mills Co., Inc. This is a notable addition to the industrial structure of South Carolina not only by reason of its mammoth size—the plant covers 14 acres—and ultra-modern design, but also because it is one of the largest cotton mills in the world on one floor and one of the two complete bale-to-bolt cotton mills built in the last 25 years. The same general area of South Carolina is also of the other completely integrated cotton mill—the White Horse plant of Maverick Mills Co. of Boston, Mass., which began operations last year in Greenville. (Federal Reserve Bank of Richmond *Monthly Review*, February 1952, page 12.)

WORLD TEXTILE SLUMP

Cotton weavers in Belgium are working a three-day week and wool mills there are running at half capacity.

Several hosiery manufacturers in England have suggested the government subsidize "dumping" of stockings in foreign markets to keep thousands of workers on the job.

Employer and union groups in Australia have warned the government that collapse of that country's textile industry is entirely possible.

Of New England's 140,000 textile workers, some 62,000 are out of work.

The findings are from a Wall Street Journal world-wide survey of the textile business. Reports from Journal correspondents in the U. S. and overseas weave a pattern of out-and-out depression among textile concerns, the like of which hasn't been witnessed since the 1930's.

Along Worth Street in New York, trading capital of the cotton textile men, inflation gets most of the blame for the slump in demand. "People have to pay more for absolute necessities like food and rent and so they keep on wearing the same old suits and dresses," one trader laments.

Unbought curtains, socks, bedspreads, shirts, sheets and fabrics are piled high in warehouses and on shop shelves 'round the world. These figures readily indicate the seriousness of the situation.

Average wool prices of Australian auctions (acknowledged the most sensitive indicator of world wool prices) currently are down as far as $1.35 per pound, compared with the March 15, 1951, record high of $3.73 and a pre-Korean price of $1.76.

The cotton picture is just as discouraging to textile men. In 1951 the U. S. exported almost 800 million square yards of cotton cloth, about 30% more than the 559 million in 1950. There are no figures available telling how the exporters are doing now, but a Worth Street economist reports: "U. S. export business has slowed to a walk and the future is very uncertain."

Textile troubles hit Britain, like everyone else, with astonishing speed. In May, 1951, wholesale stocks were way under the mark for the previous May, a healthy sign. Suddenly in June sales started a long slide, stocks began to move up. By December they were 50% over the previous December and three times above the December, 1946, level.

H. E. Lester, manager of Hitchcock, Williams & Co., one of London's biggest textile wholesale houses, sums up his firm's situation this way: "We are in the worst trade slump since 1939." He adds that despite 50% slashes on the firm's worst sellers (women's woolen jumpers and skirts) stocks are running 30% above a year ago.

Sir Frank Platt, managing director of Lancashire Cotton Corp., world's biggest cotton spinner, won't talk specific sales figures. But asked if they're down as much as 20% from last year, he stated: "Twenty per cent wouldn't cause us the trouble we're in now."

One British weaver says he's offering a fine cotton gabardine at 45 cents a yard which he sold for 72 cents a year ago. A big London department store says clothing sales are down anywhere from 15% to 25% from last year at this time, despite increased price pruning. For instance, women's wool dresses were trimmed to $18.50 from $23, men's poplin shirts to $2.70 and $4.20. (Anon. *Wall Street Journal*, March 3, 1952, page 1, and 4.)

THE SOUTH'S BIG BET ON TECHNOLOGY

The physical aspects of a technical revolution in the South are by now a national phenomenon. The statistics keep rolling up. The South's gain in per capita income has been running about 50 per cent ahead of the national average. New industry is going up at a rate of some 45 percent above that of the U. S. as a whole. Last year the South sprouted one new multi-million-dollar plant each working day, for a capital accretion in excess of $3 billion. Often overlooked is the fact that this industrial surge is largely the product of research, is mainly in such high technical lines as chemicals, petrochemicals, synthetic fibers, and light metals, which would be nonexistent but for the laboratory. While much of this research stems from the North, it is plunging the South, almost without intermediate stages, into an advanced state of technology. And in this changed climate the South is beginning to build its own research facilities for future growth. This, rather than the new physical plant, is the real revolution.

Where, prewar, the South had 32 percent of its workers in agriculture, today it has only 21 percent, and industry has definitely drawn ahead of agriculture as a major source of southern income.

Where, little more than ten years ago, there was barely a handful of industrial research laboratories in companies located in the South, there are now upwards of 160.

Where, only ten years ago, there was not one independent consulting research laboratory in all the Southeast, there are now nearly thirty.

Where, ten years ago, the South was a desert for the sale of scientific instruments and apparatus, there are now some ten manufacturers and nearly thirty distributors, with estimated sales close to $50 million.

Where, little more than a decade ago, there were only one or two major industries that could strictly be called southern—naval stores, phosphates, and Masonite hardboard—there are today at least half a dozen, of which more later.

The South's chemical dynamism carries over into textiles, still the South's No. 1 industry. To its long supremacy in cotton—over 800 mills—is now added the bulk of the new plants in booming synthetic fibers. Rayon, for instance, is today Virginia's biggest industry. And the newest of newcomers to the South is Chemstrand Corp., a joint enterprise of Monsanto Chemical and American Viscose, which. when it has finished by 1953 a new acrylic-fiber plant at Decatur, Alabama, and a new nylon plant at Pensacola, Florida, will have a $150-million capital stake in the synthesization of man's attire.

So far this has seemed to help rather than hinder cotton by creating new markets in blends. But with synthetics now accounting for 20 percent of the total textile field, and steadily bulging, the cotton-textile industry cannot afford complacency. It is vulnerable. In the recent slump in soft goods, cotton was first and hardest hit. So far, with some notable exceptions, the industry has not done much about it. Cotton research has been generally scanty or short range. (*Fortune 45*, March 1952, pages 92-5, 185-6, 188, 190, 192.)

Technical Highlights of the Month

BORDEN MILLS' FORMULA FOR QUALITY CONTROL

At Borden Mills, Inc., top management thinks that production of quality cloth calls for attention to thousands of details aside from the standard spinning and weaving operations.

For instance, Arthur B. Borden, vice-president, says: "We are trying to prove that quality fabric is reflected in costs because we think that if you make it better, you can make it cheaper. We are trying to make a quality fabric, and to do that you must watch many details, including cleanliness."

In line with this attitude, the company is pushing ahead a long-term modernization program. To date, new machinery, a quality control laboratory and materials handling systems have been installed.

The plan for 1952 includes modernization of the office building, installation of air conditioning, and the extension of the firm's own materials handling system.

Borden Mills is a 90,000-spindle plant with 2,500 looms. It is a cotton gray goods mill that weaves mostly print cloth but is 100 percent equipped for six harness, cam weaving, and every loom has feeler motion.

Cotton used is all 1-1/16-inch staple, strict low middling, middling color. This is spun into 30's single warp and 40's single filling.

Officers of Borden Mills, Inc., are Bertram H. Borden, chairman of the Board; John C. Borden, president; Arthur B. Borden, first vice-president and treasurer, and William J. Still, vice-president and general manager.

John and Arthur represent the fourth generation to head a textile operation which had its beginnings under Col. Richard Borden in Fall River, Mass., in 1825.

All mill sales are handled by the Borden Division of Iselin-Jefferson Co. of New York. However, the officers and active agents of the division are John C. and Arthur B. Borden.

In the Kingsport mill, Mr. Still oversees production and Ernest C. Cross is assistant vice-president in charge of administration. Mr. Cross is also mayor of Kingsport under a city management system and serves in that capacity for $150 per year. The general superintendent of the plant is C. C. Roberts.

Intensely research-minded, the mill management is continuously striving for ways to improve production and quality and has hit on several unique systems to reduce handling and related operations. The company is still in the process of installing Borden-engineered systems for moving materials throughout the plant.

One method in use is a picker-lap conveyor system which has been licensed to American Monorail Co., Wickliffe, O., and is being offered for sale to other mills. With this technique, the picker laps are placed on an overhead rail conveyor and slide by gravity to a set of scales where the laps are automatically weighed and their weight electrically recorded.

Overweight and underweight laps automatically set a warning system of lights and klaxons into operation. Then the defective lap leaves the scale of its own accord and moves a few feet in the general direction planned for the satisfactory laps.

However, just before entering the card room, the defective lap switches automatically on its overhead track and swings back to the picking machinery so that it may run through again. The weighed and approved laps simply leave the scale, swing on tracks to the card room, and there circulate overhead until coming to an empty card. At that point, an automatic mechanical device lowers the lap from the track and swings it into place above the card. Then, for the first time, an operator drops the lap into place and carding begins.

Borden Mills officials work closely with the Institute of Textile Technology in Charlottesville, Va. In fact, Arthur B. Borden, together with Roger Milliken, president of Deering Milliken & Co., Inc., J. L. Lanier, executive vice-president of West Point Mfg. Co., West Point, Ga., and Charles C. Merriman, Jr., vice-president and treasurer of Crompton-Shenandoah Co., Inc., Waynesboro, is on the ITT Executive Committee.

This close interest in ITT is engendered by a strong inclination to science and research. The ITT relationship, in turn, is now influencing many of the operations at Borden Mills.

For instance, the company has installed a quality control laboratory that employs 14 technicians. The members of this group are empowered with the authority to halt any machine in the mill which is not performing properly as indicated by the instruments they man.

Quality control is carried out at two points in the mill, the cotton classing room and the testing

laboratory. Actually, however, its influence reaches into every corner of the company's operations. Arthur Borden explained the reason for this by saying, "If you don't let bad work get in at the beginning you probably don't get bad cloth out at the end."

"The beginning" is the cotton classing lab. Every bale is tested before purchase and again on delivery. The first test is made by the firm's laboratory in its Memphis, Tenn., office and a second test is made at the mill when the cotton is delivered. (Condensation from *Daily News Record*, February 25, 1952, pp. 25-6, 28.)

NEW CARD, SPINNING FRAME BROUGHT OUT IN GERMANY

Fully automatic roller carding machines, in two three or four cards, and carded yarn ring spinning frames with twist drawing mechanisms have been brought out by Bremer Spinnereimaschinenbau—Gesellschaft m.b.H. of Bremen.

The new carding machines are described as being adaptable to a wide range of fibers. They come in three standard widths from 1½ to 2 meters, but are being offered built to specification for export.

Provision is made for special attachments and auxiliary equipment to handle unusual material problems, and all the card sets can be equipped with an optional card web squeezer for the complete destruction of all foreign matter in the web, it is said. The squeezer, which can be added later, is said to eliminate the need of highly cleaned raw material, to allow a thicker web, and to cut the number of thread breaks.

The squeezer rollers are self-cleaning. Pressure is adjusted by a hand wheel and the operation is sufficiently simple so that no special skill is required of the mill hand. The other Bremer machine, the spinning frame with the twist drawing mechanism, replaces twisting tubes, tin rollers, slubbing cylinders and press rolls, the maker said. (*Daily News Record*, February 11, 1952.)

ORLON WORK CLOTHES NOW BEING MADE ON COMMERCIAL SCALE

Work uniforms made of Orlon, the Du Pont acrylic fiber, now are ready on a large commercial scale.

The new Orlon clothes are being manufactured by Worklow, Inc., of a fabric specifically engineered by Travis Fabrics, Inc., of New York City. Travis reports tests under actual working conditions prove they last many times longer than those made from cotton and wool.

According to Travis, a chemical firm reported Orlon-made uniforms withstood the "worst type of acid conditions, including hydrochloric acid and caustic soda, without any sign of deterioration." One type of the new Travis-weaved fabric, designed especially for plants engaged in precision work, has proved completely lint-free, the company said. (*Wall Street Journal*, Mar. 3, 1952, page 4.)

PATENT ON SPINDLE TAPE

Allowing a total of six claims, the U. S. Patent Office has granted a patent on a tape of new construction for driving spindles on spinning frames and twisters. The tape, named the "Over-Drive," was designed by Alfred K. Landau of Newtonville, Mass. Patent rights have been assigned to Lambeth Rope, Corp., New Bedford, Mass. The United States patent number is 2,581,261.

The distinguished feature of the tape is the hinged center, which creates much greater lateral and longitudinal flexibility, it is claimed.

The ratio between cylinder and whorl is increased, resulting in the higher speed at the spindle. The increase in speed caused the tape to be called the "Over-Drive."

The increased driving efficiency attributed to the tape, causing a change in ratio, makes it desirable to effect an adjustment in order to maintain the standard twists per inch, it is pointed out. It is necessary to take out from two to three teeth of twist which increases the speed of the front roll and brings about an increase in production. At the same time, due to the flexibility of the tape, the reduction in windage and other factors, there is claimed to be generally a saving in power ranging from 4 to 8 percent. (*Daily News Record*, February 11, 1952, page 35.)

THE SACO-LOWELL GWALTNEY SPINNING FRAME

About seven years ago, the late Eugene C. Gwaltney of Saco-Lowell Shops, started to divorce himself from general research program and devoted the greater part of his time to the development of a large package spinning frame. The result of Mr. Gwaltney's work is the present Saco-Lowell Spinning Frame.

The front rolls of the new frame are located at an unusually great height above the ring rail, namely 27½" at the bottom position of the ring rail, which would yield a node or necked shape of balloon converted to a different shape by the movable rings which engage it at various levels. Ring

1 is a small diameter pigtail; ring 2 is nearly as large, while ring 3 is slightly larger than the spinning ring.

The spinning ring is traversed through a distance of 11¼", and rings 1 and 2 move, together, a distance less than this traverse. Ring 3 moves through the same traverse as the spinning ring.

Extremely large packages are produced under economically practical operating conditions. "Ends down" are low, even in low twist operations. The tension in the spinning thread is low and the variation of tension during the doff is low. Quality of the yarn is high. A single gauge of frame is commercially economical for the entire range of counts, so that a mill installing a frame for use on one count can readily convert to a much finer or coarser count.

The yarn control is revolutionary and results in a decrease in the tension on the yarn as compared with conventional spinning. More important, this tension is evenly maintained within close limits throughout the building of the bobbin and at all positions of the ring rail. The benefits of this reduced variation are manifest in many aspects. The minimum variation in yarn tension permits the use of the longer traverse, building bobbins longer than heretofore possible on a cotton type spinning frame. Traveler weights may be selected with greater accuracy to suit the yarn size because of the more uniform conditions of tension at all points in building the bobbin. With such reduction in traveler tension and the very significant decrease in tension variation, it now appears possible to run the traveler up to 50% faster and at the same time to extend its useful life substantially.

Also with the decreased and uniform tension of the traveler, larger ring sizes may be successfully used. The increase in ring size is vastly important, particularly on finer counts of yarn, as the larger full bobbin diameter permits more yarn to be put on the bobbin and increases the doffing cycle. The Gwaltney Spinning Frame is so designed that it seems most likely that only two ring sizes will be required to run the majority of yarn counts now spun commercially in this country. A 3" ring is now indicated by present experiences to be suitable for the spinning of medium or coarse counts, while a 2¾" ring is accepted as correct for the counts ranging from medium through fine. In some special cases, for very fine yarns, a 2½" ring may prove desirable.

Our experience with the Saco-Lowell Gwaltney Spinning Frame has given us convincing evidence that under average operationg conditions there will be significant reduction in the number of ends down per thousand spindle hours. The decrease in yarn tension and the absence of variation therein, together with the uniform twist distribution in the yarn, are important factors in creating better operating conditions and higher efficiencies.

We have always felt that the primary importance of new equipment was an improvement in quality and not merely a decrease in cost. While reduced costs are important, the first consideration in buying yarn or cloth is still, and always will be, quality. There are numerous ways to decrease costs, but a sacrifice in quality will not allow a mill to remain competitive. The Gwaltney Spinning Frame offers worthwhile advantages because it is able to spin yarn of improved quality. While it is obvious that costs will be decreased, the prime importance of this new spinning frame lies in its ability to spin yarns of higher quality at lower cost. Filling yarns and knitting yarns with low twist necessary to achieve a soft and lofty hand may be produced on the Gwaltney frame without difficulty.

Summarizing the major advantages offered to the mill utilizing the Saco-Lowell Gwaltney Spinning Frame, first and foremost, there will be an improved quality in the yarn which will increase machine efficiency both in spinning and in weaving. Also a higher spinning production is possible as stronger yarns may be spun with less twist. Finally, the larger package makes rewound filling economically practical. In the spinning room the large package naturally greatly lengthens the normal doffing cycle with a resultant increase in machine efficiency to give a greater overall production per spindle per hour. This large package will also reduce winding costs as there will be less knots and less waste from tailings and other spooler or windage waste.

Saco-Lowell engineers have designed an entirely new spinning frame involving the Gwaltney principles. Since large rings were to be used, it was necessary to build a frame of wider gauges. To compensate for the extra floor space inherent in the wide gauge, the frame was made narrower. While designing the new frame, it was deemed advisable to adapt it to air cleaning, self-lubrication, and other labor-saving devices. These objectives have been completely realized so that when first seen, the Saco-Lowell Gwaltney Spinning Frame, with its narrow width and smoothly finished surfaces, is of startling appearance. A close examination will show the numerous improvements which have been made in all parts of the frame. The chassis itself is manu-

factured to eliminate cumbersome obstructing parts under the chassis. The greatest possible advantage has been taken of all the new methods of metal working and of the new metal alloys now available to obtain a maximum amount of rigidity and strength with a minimum amount of weight. The frame is strong without being massive.

The head end and head end gearing are entirely different from that of any conventional frame. Although the frame is narrow, the gearing has been compactly placed so that there is adequate space for adjustments. There have been several very practical innovations in making up this head end. As an example, all of the change and constant gears in the head end and in the draft gearing are of the same bore and have teeth of the same pitch and width. Any mill man will appreciate this feature as it means that one set of gears can be used as change gears for draft, twist, and lay, with the only difference in any gear being the number of teeth. The interchangeability eliminates the necessity of carrying a large stock of gears and further eliminates the confusion and time lost where gear dimensions vary. As a further refinement, the gearing is designed so that quick changes in draft gear constants may be made.

The draft gearing for both sides of the frame is enclosed in the upper part of the head end, driven by quiet chain drives. The upper portion of the head end which houses this gearing may be lifted up at either side of the frame for quick changes or may be removed entirely from the frame to expose all of the draft gearing if gearing is desired. The doors of the frame are held shut by a magnetic lock which cannot get out of order, does not require maintenance, and which holds the doors tightly shut.

In order to make full use of the new principles, the frame has been equipped with a completely new drafting element. The steel rolls mounted in anti-friction bearings are carried on a die-cast roll stand pitched 60 degrees and positioned to deliver the yarn directly over the center of the spindle. The weighted Saco-Lowell-Torrington Top Rolls are permanently fastened to an arm in order to eliminate the conventional cap bars. Since all of the bearings contained within the drafting element are self-lubricated, the entire assembly will not only require much less cleaning but will be easier to clean since there is an entire absence of oil to catch and hold lint and dust. Lubrication will be required at intervals of six months or longer.

The Saco-Lowell New Era Spindle has been made standard equipment on this frame. It will

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100 times out of 100, during the weaving process, warp yarn touches metal while travelling from Warper Beam to Cloth Roll. Susceptible to chafing, jagging, and marking, yarn requires equipment of the most superior design, raw material, finish and polish to eliminate the costly breakage that can only result in the risk of 'Seconds' or 'Rejects'.
Top quality runs . . . Firsts can only be assured by using top quality loom harness equipment. Preferred by nine out of ten mills, STEHEDCO and SOUTHERN with their years of research and experience have made it possible to TRAVEL YOUR YARN FROM WARPER BEAM TO CLOTH ROLL WITH THE FULLEST POSSIBLE PROTECTION ATTAINABLE TODAY.
SERVICE . . . from any of their large strategically located plants, engineering staffs and mill trained field representatives conversant with mill problems and understanding the importance of equipment and product performance are ready to serve you . . . just phone, write, or wire.
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definitely carry the heavier packages and long traverses of the Gwaltney frame without difficulty.

The frame is driven by a motor located under the frame near the front end. The motor has been specially designed for this frame and is unique in being water cooled. Today many modernization programs involve complete air conditioning. For this reason, a water cooled motor of special design has been adopted for the Gwaltney frame. The heat generated by the motor is carried off by the coolant, thus reducing to a worthwhile degree the load on the air conditioning unit. Further, the motor has a type of winding which assures a satisfactory uniform efficiency during the entire cycle of the doff. The drive from the motor to the cylinder is through a very efficient type of V belt to assure a wide range of speeds.

A completely new builder motion adaptable to either warp filling or combination wind has been designed for the spinning frame. The new builder develops an accurate and uniform motion for the ring rail, anti-node rings, and thread guides. A wide range of change gears give complete control over such details as the rate of traverse and the taper at both ends of the bobbin.

Since overhead cleaners have become standard equipment in the modern mill and our experience has shown that with the conventional creels the overhead cleaners do not operate at their maxumum efficiency, we have eliminated conventional creel and have adopted the Umbrella type creel as standard equipment. This creel has several advantages: it will take 12 x 6 roving bobbins, improves the overall cleanliness of the frame, and its ball bearing bobbin suspension reduces the danger of stretched roving.

As there will be a definite reduction in the "Ends down per thousand spindle hours" with the Saco-Lowell Gwaltney Spinning Frame, the Pneumafil waste collecting system has been adopted to make the operation of the frame as nearly automatic as possible.

All of the bottom rolls have anti-friction bearings; the top rolls are all equipped with needle bearings which require lubrication only at very long intervals and practically reduce to a vanishing point the work incidental to cleaning top rolls. The head end and draft gears, cylinders, traverse motion, and builder are also equipped with anti-friction bearings. Nothing on this frame requires lubrication more often than six months. Finally, with the New Era Spindle requiring lubrication at intervals of years instead of weeks, the oil can in rooms equipped with the Gwaltney Spinning Frame is as anachronistic as the spinning wheel. (Saco-Lowell News Release, April 1, 1952.)

HANDLING THE NEWER SYNTHETICS ON THE WOOLEN SYSTEM

In preparing to make a blend, the new synthetic fibers alone should be given one preliminary opening before they are introduced to wool, using a type of opener that has straight pins rather than the cockspur type of pin. The action of this type of picker is much more gentle and reduces the fiber breakage considerably.

A regular wool picker can be used for actual blending and the fiber breakage will be reduced to a minimum because the synthetic has already been opened and because there is a percentage of wool along with it to cushion the shock.

All of these new fibers have been supplied by the fiber manufacturer with some sort of finish that is intended to be sufficient lubricant for picking, carding, and spinning. Nothing needs to be added.

Equip cards with static eliminators as a safety precaution. Humidity should be kept in the neighborhood of 60 to 54% r. h. All these precautions are suggested particularly if you are going to run any 100% synthetic fiber through woolen cards. With wool blends, static is not usually a problem.

In feeding these newer fibers and/or blends to a woolen card, you will find that loftiness may cause a little trouble in the weigh pan and on the first feed apron. The remedy here is to make more frequent and lighter drops and to speed up the feed rolls to compensate for the lighter feeds. When running 3.0-denier fibers, which means that there are many more fibers per pound, it is suggested that the speed of the workers be increased from 20 to 30% to provide ample points for the fibers to engage. Also, when running 3.0-denier or finer fibers, it is usually necessary to use a three-card set. For all fibers coarser than 3.0-denier, a two-card set is ample is 100% synthetic fiber is being processed. If you have wool blends, you will have to be the judge of how much carding the wool content will need.

Orlon, Acrilan, and dynel are harder to rub, and the rub should be set down a little.

The usual setting for the apron rolls is a 26 gauge, with the tension roll in the center set with a 28 gauge. It may be necessary in certain circumstances to set the tension roll up to a 30 gauge.

Better results are obtained in spinning fibers with lightweight spools. (*Textile World*, Jan. 1952.)